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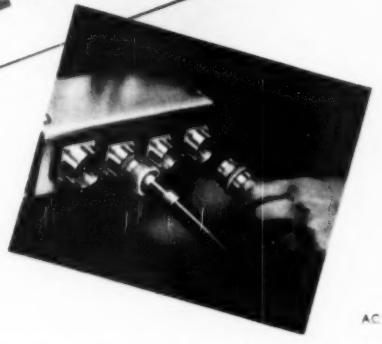

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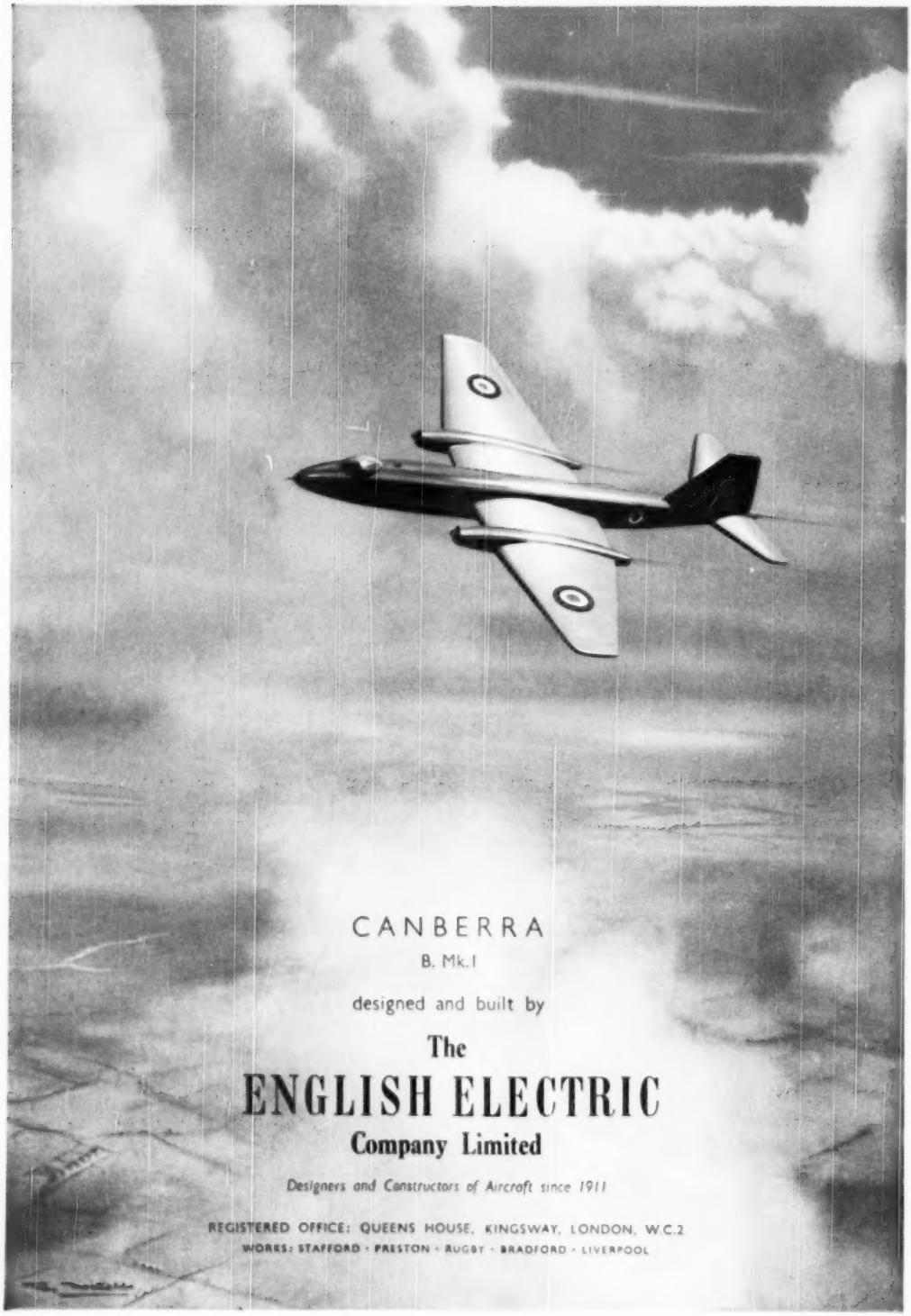
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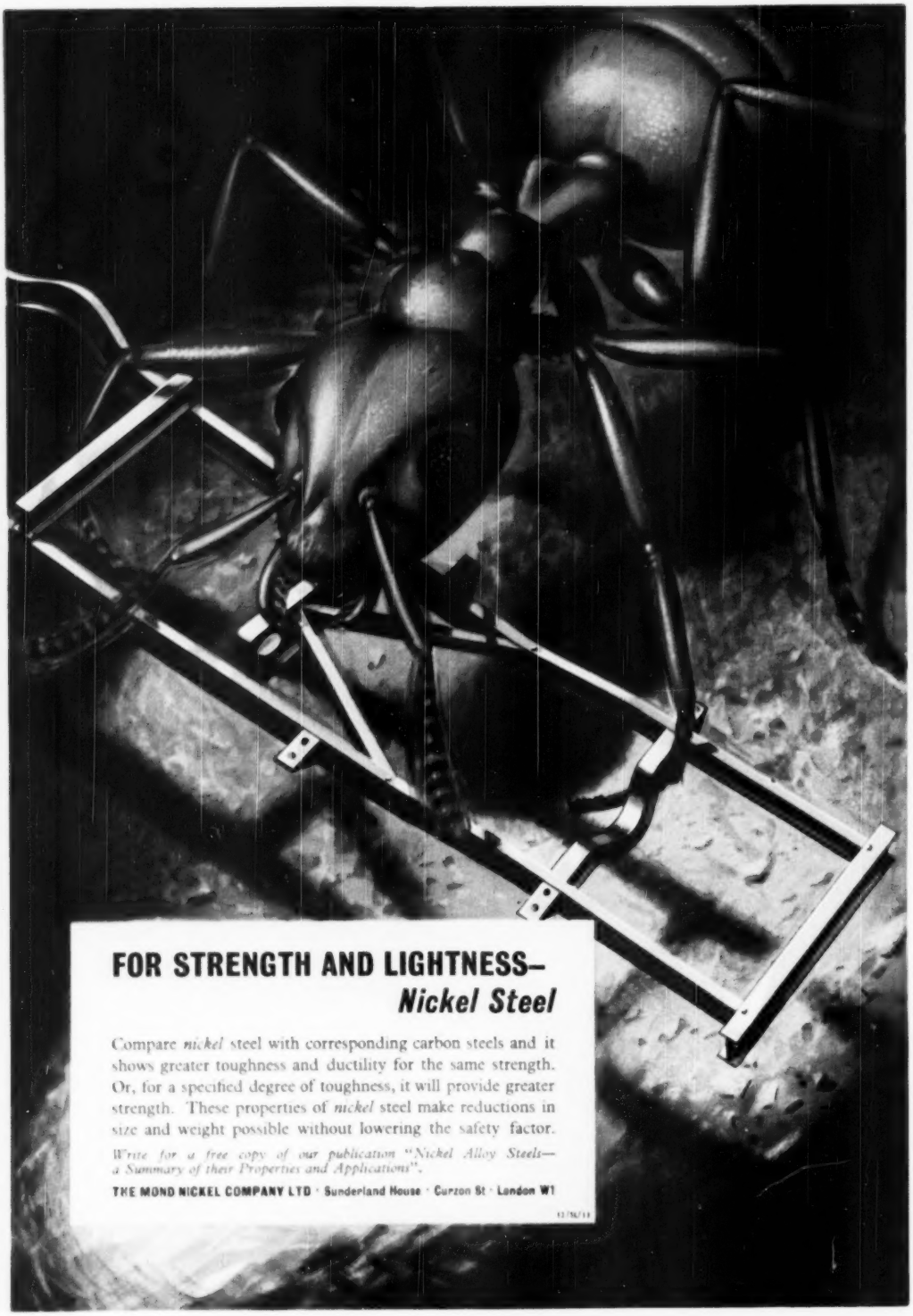
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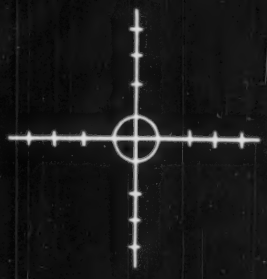

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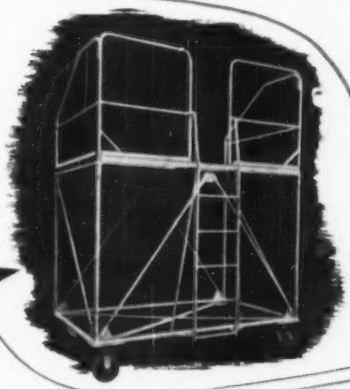

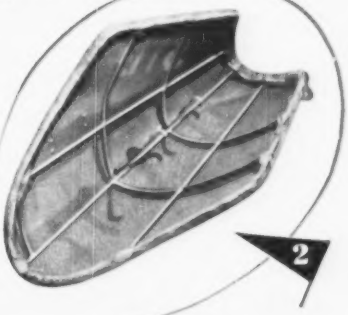

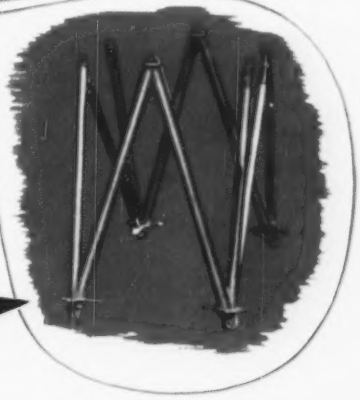

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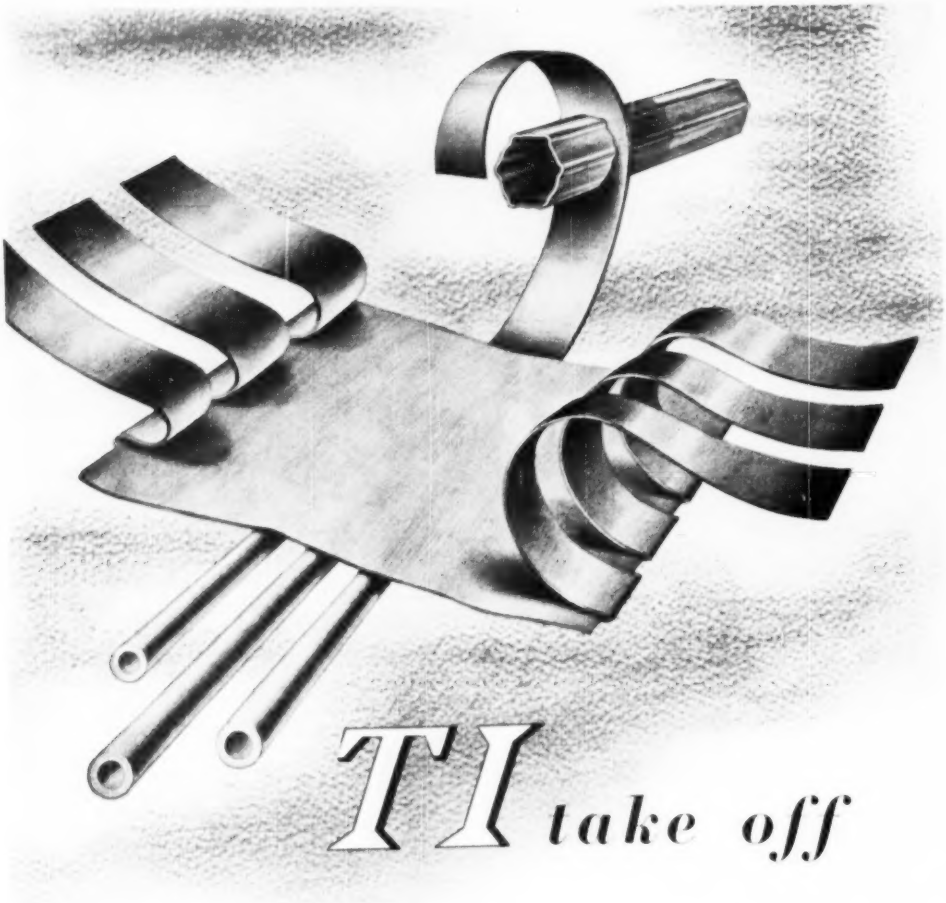

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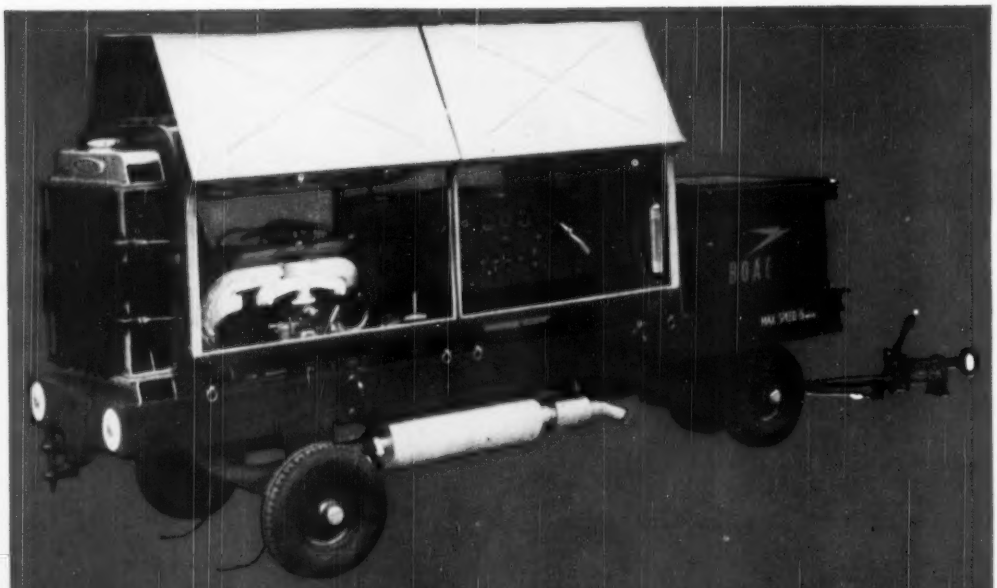

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★ *Eliminates use of heavy service accumulators.*
★ *Self-starting engine.* ★ *Special controls.*
★ *Low trailer.*

A Murex Ground Power Unit has been regularly used to start the famous de Havilland "Comet" ever since its first flight. Also used for Vickers "Viscount", Armstrong Whitworth "Apollo", Handley Page "Hermes IV", Boeing "Stratocruiser" etc.

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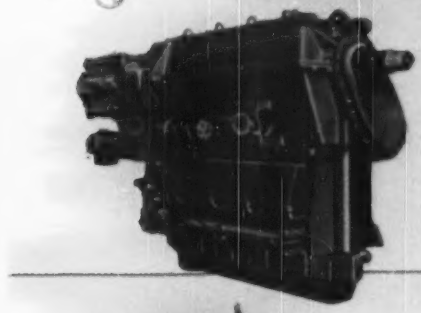
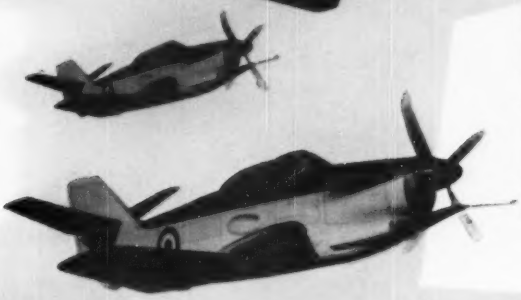
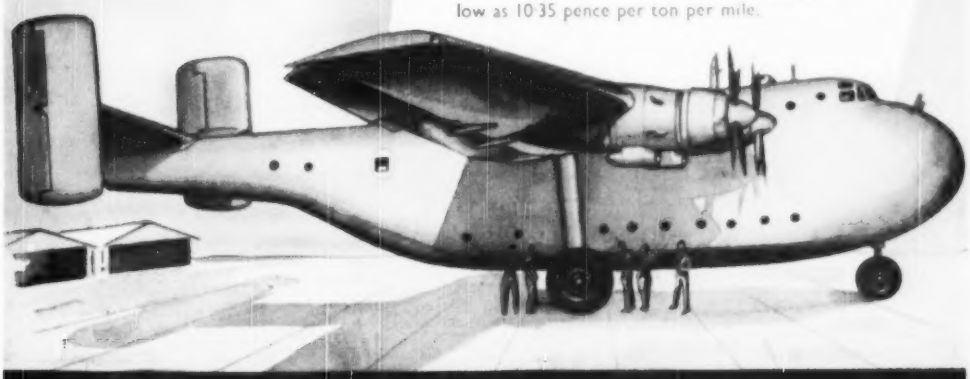


BIG return of power in relation to weight is a main feature of the 180 h.p. Cirrus Bombardier. This direct petrol injection power unit is being widely specified by the Service and Civil Technician alike.



BIGGER potential striking power is provided for the Royal Navy by the Y.A.S. anti-submarine aircraft. This versatile, heavily armed machine which is powered by a Rolls-Royce Griffon Piston engine or Armstrong Siddeley Double Mamba Turbo-Prop Unit, has an exceptional operational performance.

BIGGEST payload of all contemporary British civil aviation projects — 15 tons — is possessed by the Universal Freighter. This economical all-weather aircraft needs only 585 yards for take-off and cruises at 175 m.p.h. The total direct operating cost is as low as 10·35 pence per ton per mile.



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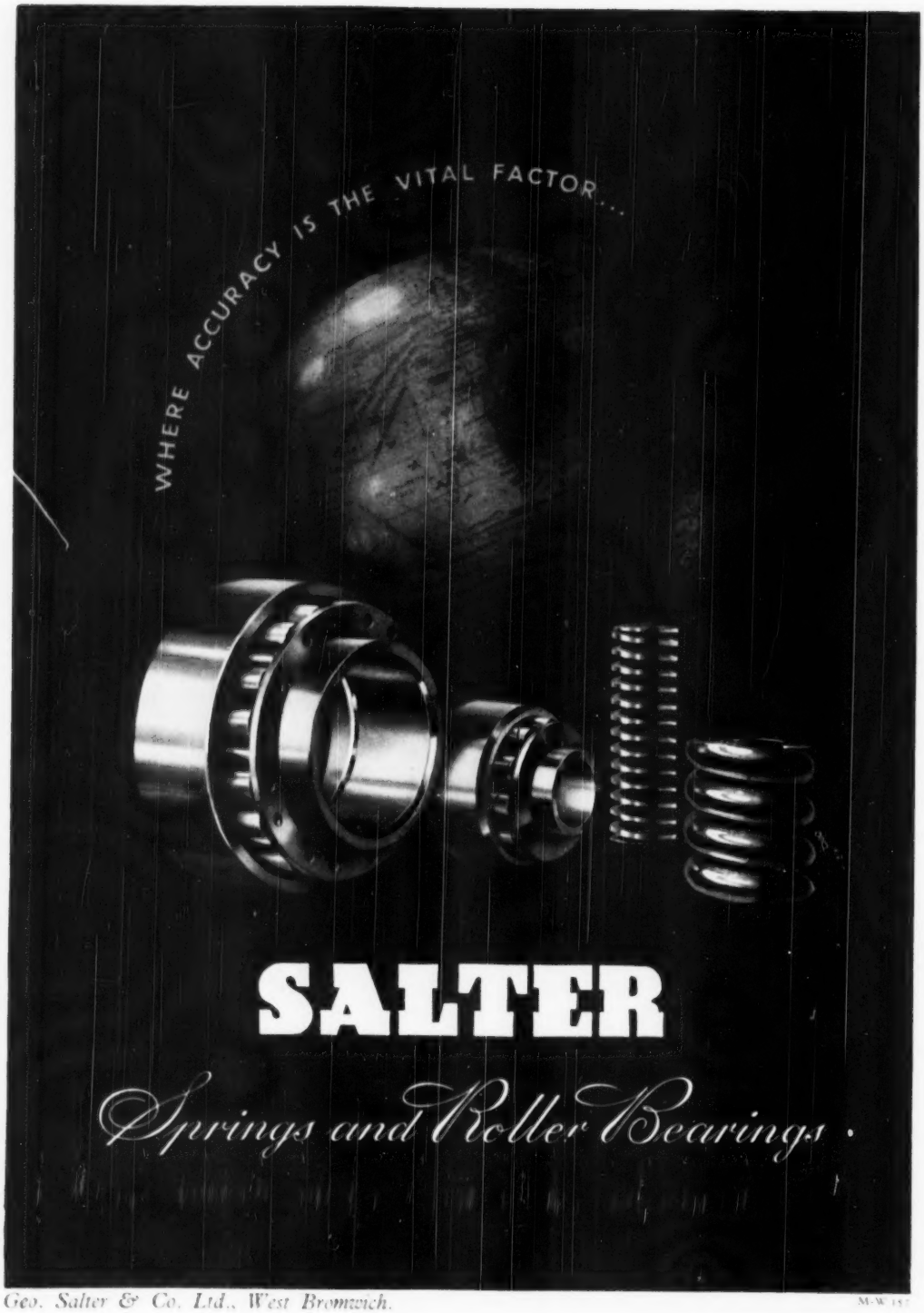

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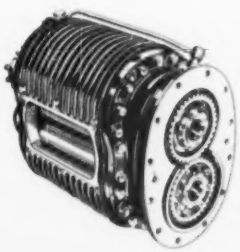

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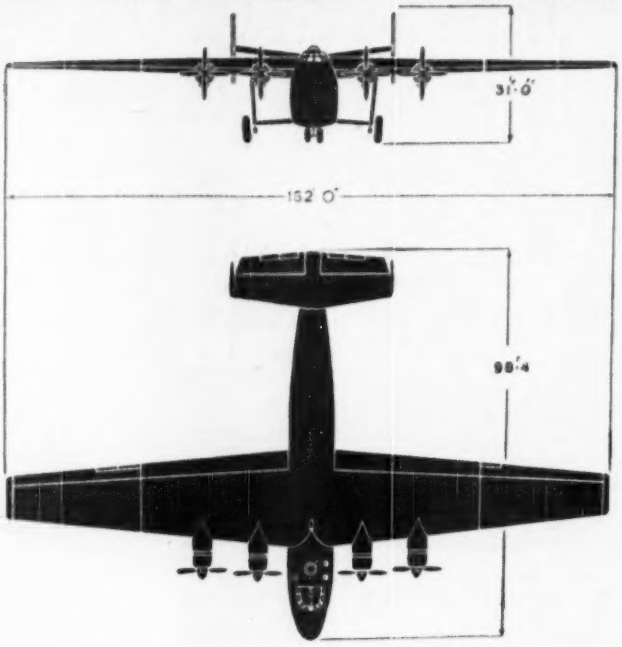

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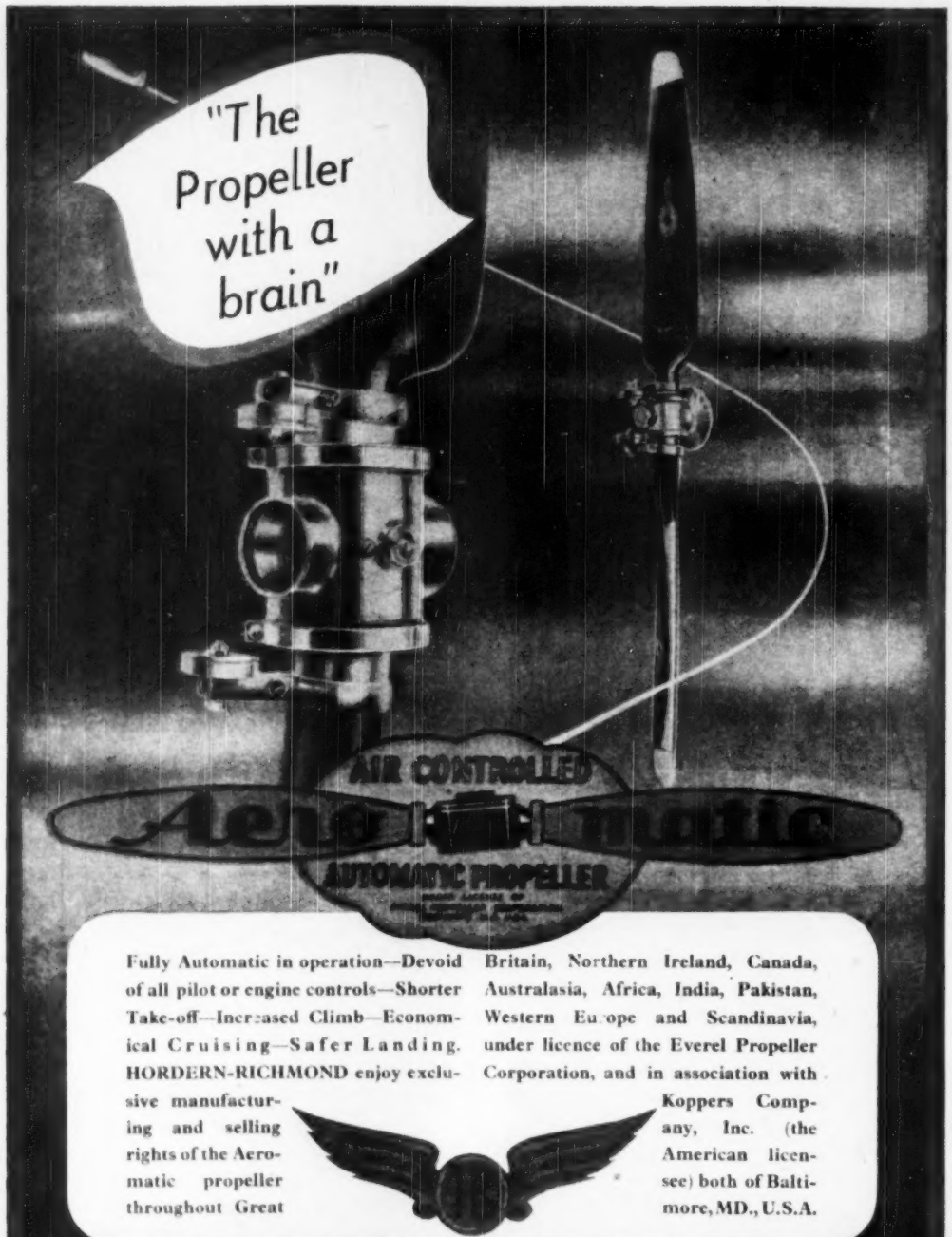

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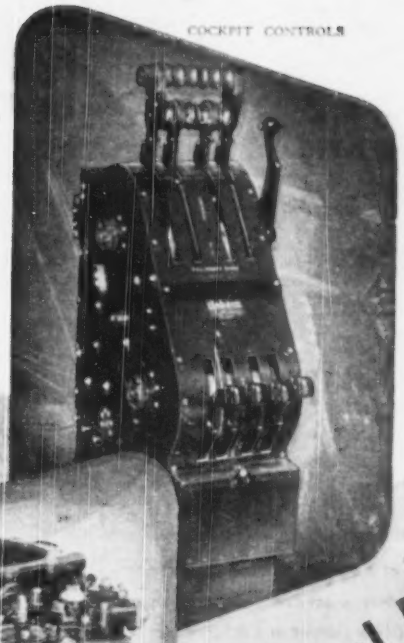

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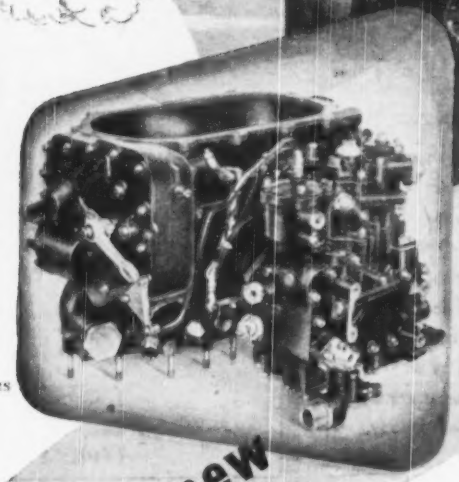

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THE HYDRA-STATIC TWO-LEADING SHOE AIRCRAFT BRAKE

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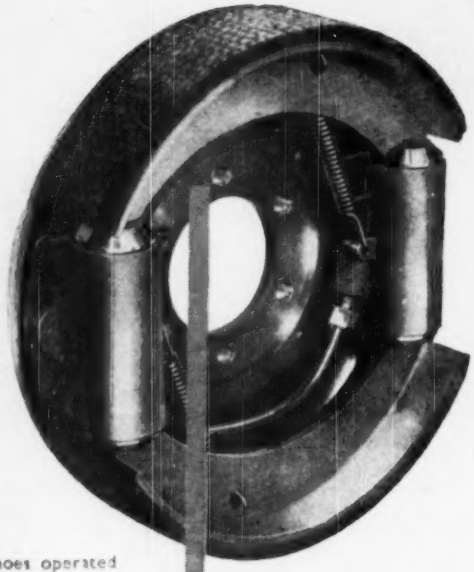

THIS brake consists of two self-aligning shoes operated by two wheel cylinders spaced diametrically opposite. Each wheel cylinder has two pistons of a different form: one having a slot at right angles to the axis of the bore, which operates the shoe when the brake is used in forward rotation and the other with the slot inclined at an angle to the bore which forms the abutment for the other shoe in similar condition. This inclined slot has a predetermined angle which allows the shoe to align itself accurately to the drum as well as forming the abutment. The total shoe reaction is transmitted via a shoulder on the piston to the cylinder body. By this arrangement, two-leading shoe operation is obtained in either direction, and greater power for a given input and greater stability is obtained.

TYPICAL FIGURES

5⅞" x 1½"	Approximate maximum dynamic torque 2,950 lbs. inches, at 60 lbs. per sq. inch lining drag. Two ¾" diameter cylinders.
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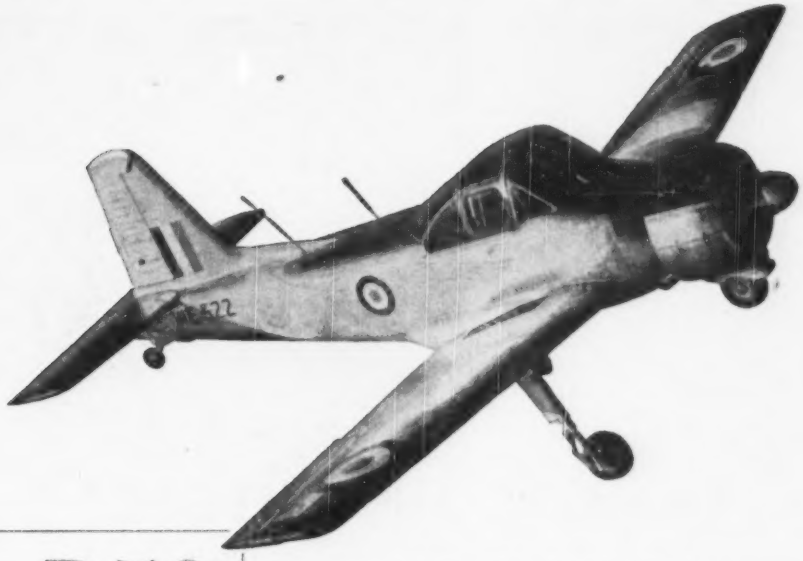

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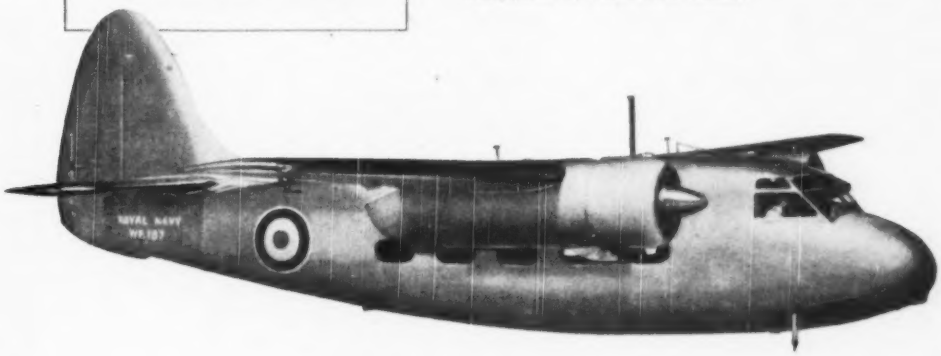
- The Percival "Prince" illustration is of one of the Royal Navy's flying classroom and communications aircraft. Adapted from the versatile "Prince" (8 to 12 passenger feeder-liner built to I.C.A.O. Standards), the "Sea Prince" marks the introduction of a new and economical Air Force crew trainer.



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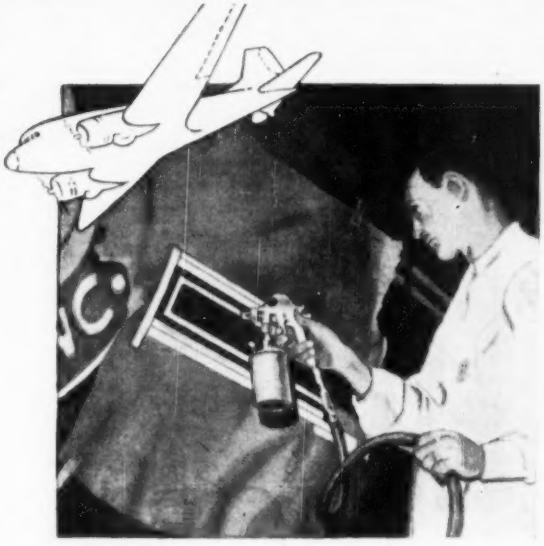

"DUREX" *Masking* TAPE

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fire safety for aircraft and airfields

The Pyrene Company have devoted many years of study and research to fire problems which have to be contended with on aircraft and airfields, producing developments of a far-reaching nature. Some of the latest Pyrene Fire & Safety Appliances are detailed here and will be on display at the S.B.A.C. Exhibition. Details sent on request.

AIRCRAFT SMOKE AND FLAME DETECTORS

The Pyrene Aircraft Smoke Detector provides visual and or audible warning of fire in baggage compartments and other inaccessible places. It operates on the photo-electric cell principle and enables the crew to take immediate action against the fire. Approved by the Air Registration Board. Another new development in Fire Safety to be seen on the Pyrene Stand is the Pyrene Flame Detector for aircraft, designed to give instant warning of fire occurring in power plants.

CO_2 FOR "STARTING-UP" FIRES

The Pyrene C.D.T. 212A mobile Fire Appliance is specially designed to extinguish "Starting-up" fires. It comprises two 12-lb. capacity CO_2 Cylinders mounted on a light steel trolley fitted with pneumatic tyred wheels. The cylinders are connected to a high pressure hose with a telescopic applicator, which automatically extends when CO_2 gas is released, permitting the full concentration of CO_2 to be applied to the engine.

CO_2 APPLIANCES

The wide range of Pyrene CO_2 Fire Extinguishers and appliances includes models suitable for fire risks on aircraft and in airfield buildings where highly inflammable materials are involved.

"WET" WATER EXTINGUISHERS

The Pyrene Model P.A.33 Fire Extinguisher is of the pressure operated, "Wet" water type and is recommended for use against incipient outbreaks in aircraft cabins, etc. It is small, light in weight and easily operated with one hand.

AIRFIELD CRASH TENDERS

Pyrene Airfield Crash Tenders are the most advanced fire-fighting vehicles of their kind and are in use on many airfields all over the world. The latest type is a self-contained unit capable of delivering 3,500 gallons of foam and 2,400 cubic feet of CO_2 gas within 1½ minutes. Built on a Thornycroft "Nubian" chassis with four-wheel drive suitable for swift transit over rough or soft ground, this crash tender can be brought into action within nine seconds of its arrival on the scene of the fire.

METHYL BROMIDE EXTINGUISHERS

Methyl Bromide Pressure Type Hand Fire Extinguishers are used as first-aid protection on aircraft for fires involving highly inflammable liquids. Methyl Bromide is a quick-acting extinguishing agent and harmless to delicate material and mechanism. The Pyrene P.27 model is made to Air Ministry specification.

SODA-ACID EXTINGUISHERS

The range of Conquest, Soda-Acid Extinguishers includes several models designed to put out fires involving freely burning materials such as wood, paper, fabrics, etc.

FOAM

Pyrene Foam-making Branchpipes and Mechanical Foam Generators have achieved widespread recognition for their efficiency in combating oil, spirit and other highly inflammable risks. They are particularly suitable where large quantities of oil or spirits are stored or used.

S.B.A.C. EXHIBITION
STAND No. 35
FARNBOROUGH, SEPTEMBER 5th—10th

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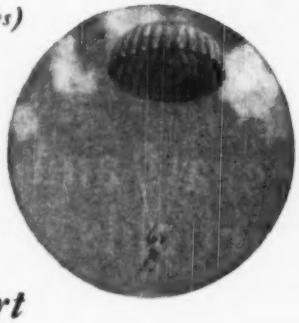

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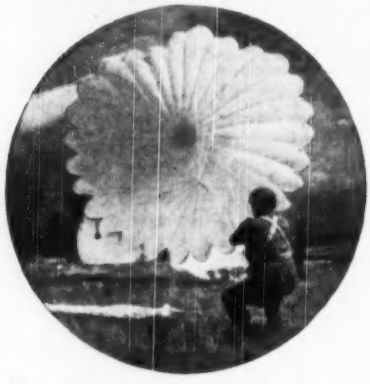

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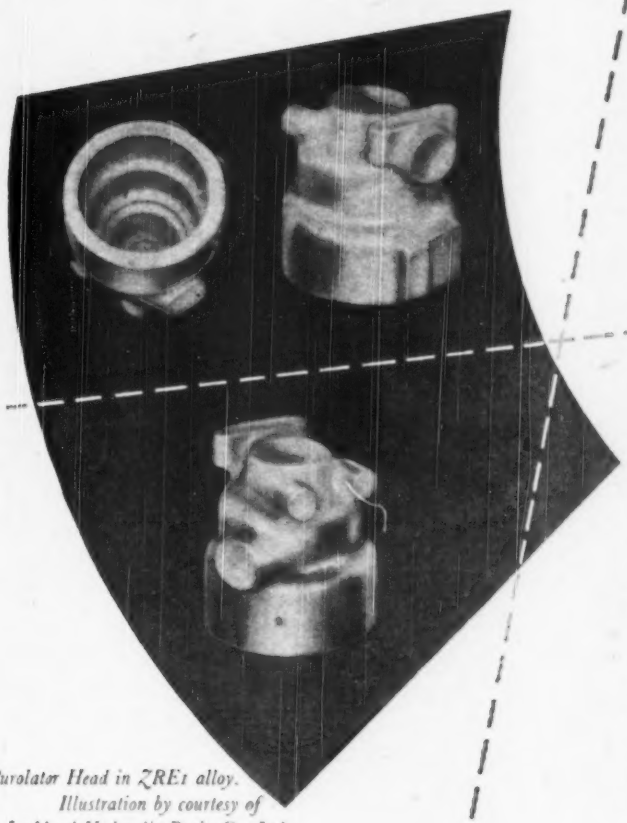

Purolator Head in ZRE1 alloy.
Illustration by courtesy of
The Lockheed Hydraulic Brake Co. Ltd.

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"Elektron" ZRE1 . . . . the magnesium - zirconium - rare earth metal alloy with the high creep resistance at elevated temperatures . . . is also specially suitable for applications which have to be pressure-tight. Components in this alloy have been pressure-tested up to 2,500 lb/sq. in. with paraffin without any signs of leakage. Easily founded, free from microporosity and possessing the high strength-weight ratio of all the "Elektron" alloys, alloy ZRE1 widens the scope for the design of sound, intricate castings.

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The Significance of Farnborough

THE Dismal Jimmies prophesied that Britain's aircraft industry, having displayed such a variety of excellent products for two or three successive years, would prove by Farnborough-time this year to have shot its bolt, at least so far as new types of aircraft were concerned; but the industry knew better, and quietly went ahead to astonish the world again.

The 1950 S.B.A.C. Display, however, is significant not only for the new and much-improved types of aircraft, but for the abundant manifestations that manufacturers are determined to keep abreast of operational requirements. The Korean struggle, for instance, has proved that the modern jet fighter is a very potent ground-attack weapon, and although our Meteors and Vampires are already capable of carrying formidable projectile loads, the Gloster concern is to be congratulated on its private-venture Meteor—truly a flying arsenal. Again, a really capacious freighter—larger even than that most meritorious work-horse, the Bristol 170—is both a civil and military requirement, and the G.A.L.60 is therefore an especially welcome 1950 debutante (if such a matronly form can be so termed). Then there are the Fairey and Blackburn anti-submarine aircraft, unmatched in their field by any other type in the world. Another gratifying sign is that our fighters are now equal, or perhaps superior, in speed to the fastest types abroad; and, we may be sure, machines such as the Hawker P.1081 and Supermarine 535 are unsurpassed in their class for tractability and all-altitude manœuvrability. Progress with jet night fighters is, to say the least, encouraging.

Development of civil aircraft proceeds at a healthy rate along paths wisely chosen years ago, when the future was obscure and fraught with financial and technical perils. The magnificent Viscount 700 may be cited as another example of how British manufacturers revise or adapt their products to meet the needs of the hour. So excellent was the smaller prototype that development for greater capacity proved a straightforward and rewarding task.

Among the power plants the new axial-flow turbojets are of commanding interest. The Sapphire is the envy of the world and now takes its place alongside the Avon in maintaining and extending Britain's jet lead.

Progress such as that outlined is, of course, impossible without commensurate contributions from the suppliers of materials and ancillary equipment. We therefore offer our congratulations to all sections of an industry whose achievements—often in trying circumstances—should prove a national inspiration.

"FLIGHT" THIS WEEK: IMPORTANT NOTICE

As readers will be aware, *FLIGHT*, in common with other periodicals published in London, has for some weeks been affected by the withdrawal of overtime working by a section of the printing industry. Last week the dispute took a graver turn, and a stoppage of work followed.

We were therefore faced with the alternatives of, on the one hand, not publishing this issue at all or, on the other, of offering readers an issue consisting of those pages which had gone to press before work ceased. In view of the importance of information about exhibits at the S.B.A.C. Show, especially to foreign buyers now in this country, the second alternative was chosen.

Accordingly, while many normal features are perforce missing, this special "Britain's Aircraft Industry" number provides a detailed and fully illustrated review of current British aircraft. Thus it still largely fulfils its original intention, namely, to show the world what Britain has to offer in civil and military aircraft.

Our plans for future issues, assuming there is no immediate settlement of the dispute, cannot be stated at the moment. Meanwhile, the Editorial Staff at Dorset House, Stamford Street, London, S.E.1 (Waterloo 3333) will answer any necessary enquiries.

NEWS IN BRIEF

GENERAL NEWS

This Sunday (September 10th) the R.A.F.A holds its Festival of Remembrance at the Albert Hall, the following Friday is Battle of Britain Day, and on the Saturday 71 R.A.F stations (list on p. 256 last week) are open to view. For the South Coast Race on the same Saturday (details, p.253 last week) there are now 76 entries: start is at Hurn Airport, Bournemouth, at 2 p.m (public will be admitted); the first aircraft should approach Portsmouth about 2. 30, Brighton 3, Dungeness at 3. 30 and finish at Herne Bay Pier soon after 3. 45 . . . Abroad, the Biarritz Rally takes place this week-end . . . America continues to speed-up military aircraft deliveries: Lockheed have reconditioned and ferried F-51 Mustangs to an unnamed "European nation" . . . A team of Canadian scientists has brought over an R.C.A.F. North Star "flying laboratory" to demonstrate de-icing methods to British technicians . . . Notable flight: 21,500ft and 193 miles from Odiham to Driffield, by Flt. Lt. A. W. Bedford, of the E.T.P.S., in an Olympia sailplane.

FARNBOROUGH ITEMS

Possible loads of the private-venture Gloster Meteor, for intensified ground attack, are four 1,000-lb bombs or five external tanks (ventral, under-wing, and wing-tip). Two additional 20mm guns (making six) can be mounted under the fuselage, instead of the ventral tank . . . The Supermarine 535 is a development of the 510, having a Nene with afterburner, nosewheel undercarriage, and lengthened nose (o.a. length is now 42ft 11in) . . . The D.H. Venom night fighter is the newest of its class . . . The H.P.R.2 trainer has a maximum speed of 173 m.p.h. and a range of 500 miles . . . The Armstrong Siddeley Sapphire ASSa.3 has run the 150-hr Service Type Test at 7,200 lb thrust — 1,000 lb more than any previously announced type-test figure. Applications are foreseen in fighters, bombers, transports . . . The Adder, a pure-jet version of the Mamba, gives 1,098 lb net thrust. . . . "Public" days are next Saturday and Sunday, Sept. 9th-10th; gates and static show open 10 a.m., flying display 3 p.m.; admission 3s, cars (with occupants) £1; for other details, including information on public transport, see p. 247 of last week's Flight.

CIVIL AVIATION

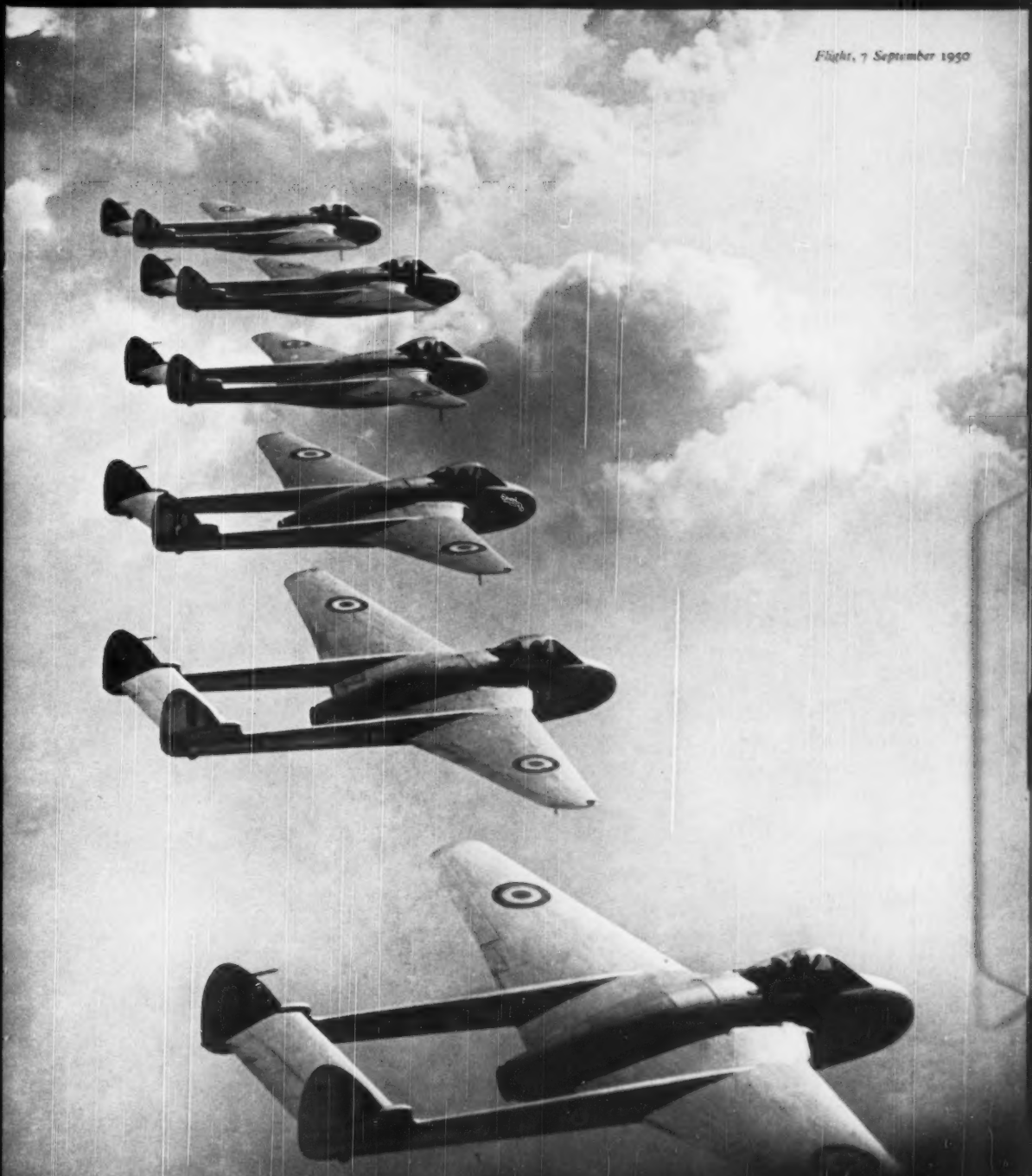
For operations in the financial year ended March 31st B.O.A.C.'s deficit was £7,791,887 — a reduction of £14,087 on a comparable figure for the combined operations of B.O.A.C. and B.S.A.A. in the previous year. B.E.A.'s deficit, as previously mentioned in *Flight*, was £1,363,594 . . . The first production D.H. Drover was delivered to Q.E.A. last month for operational trials in New Guinea . . . Charter tenders have been invited for the movement of nine R.A.F. units, mostly within the United Kingdom, during September; so far there are no indications that any long-distance flights or long-term contracts are forthcoming . . . It is now confirmed that Ansett Airways are negotiating for the purchase of New Zealand's State-owned airline . . . The first Constellation to be used on S.A.A.'s Johannesburg - London route arrived at London Airport on August 27 . . . S.N.C.A.S.E. proposes to equip its S.E. 2010 Armagnac with 5,000 h.p. Allison T-40 turboprops in place of the 3,500 h.p. P. and W. R-4360 engines now fitted . . . A total of 134 B.O.A.C. senior pilots now qualify for the title of "mileage millionaire"; seventeen have completed two million, and one — Capt. O. P. Jones, O.B.E. — three million miles . . . Activity at British airfields in July was the heaviest ever recorded for any single month — over 335,500 passengers were handled at all reporting airfields . . . Following the recent re-allocation of transatlantic routes to American operators, T.W.A. will begin passenger services to London and Frankfurt on September 30th; P.A.W.A. will start serving Paris and Rome on or before September 29th . . . B.O.A.C. announces a fare reduction of 15 per cent and a frequency increase to four times weekly for its direct New York-London services . . . The Comet was scheduled to visit Scotland last week for tests of its Ferranti D.M.E. equipment.

SERVICE AVIATION

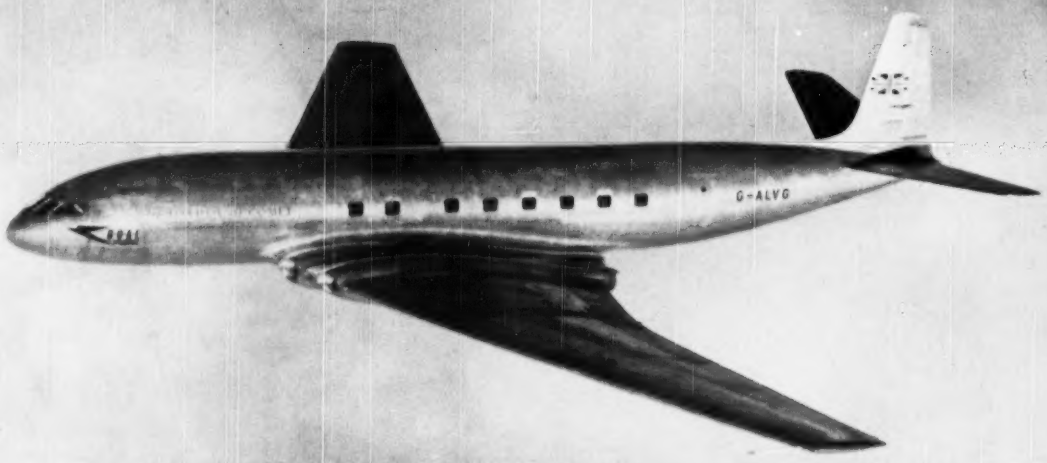
Applying to all R.A.F. ranks up to Air Commodore, new Service rates of pay took effect on September 1st. Typical basic daily rates are now: Wing Commander, 55s 6d; Flying Officer, 19s 6d; Flight Sergeant (Group A), 21s 6d; Aircraftman, 2nd Class (Group A), 11s. Flying pay has been restored to the R.A.F., (and increased for the Navy). R.A.F. aircrew officers will receive up to 9s daily flying pay, and non-commissioned aircrew up to 6s. Gratuities payable at the end of short-service engagements will be greatly increased — for officers, from £700 to £1,500 . . . The period of National Service will be extended from 18 months to two years until further notice . . . From January 15th next, the R.C.A.F. will train R.A.F. pilots and navigators in Canada. The initial plan provides for the training of 200 R.A.F. aircrew in Canada during 1951. The outstandingly successful wartime Commonwealth Air Training Plan, thus revived on a small scale, trained over 130,000 Allied aircrew between May, 1940, and March, 1945. The R.C.A.F. is already training a number of European aircrews under the terms of the North Atlantic Treaty . . . Canada has decided to buy 100 war-surplus Mustangs, presumably as an interim defence measure pending delivery of Canadian-built jet fighters . . . Swedish Vampires, en route to North Weald for a ten-day courtesy visit to Britain, were diverted to Wunsdorf on August 30th by bad weather. They were flown to North Weald next day . . . The American Air Force and Navy are conducting a joint "training aircraft evaluation programme" as a step towards future standardization of North Atlantic training methods and training-aircraft specifications; a Boulton Paul Balliol will take part in comparative trials with four American and two Canadian trainers . . . A. Cdre. Finlay Crerar, C.B.E., has been appointed Inspector of R. Aux. A.F.

THE INDUSTRY

British aviation exports for July totalled £3,773,667 . . . Automotive Products, Co., Ltd., are to build a new factory at Speke, employing 1,500 in 1952-53 . . . An all-light-alloy hangar is to be erected at London Airport by Structural and Mechanical Development Ltd., Slough, associates of Almin, Ltd. . . . Clear Glass Products Ltd., Warsash, Hants (makers of Avigel and other protective coatings), have changed their name to Corrosion, Ltd.



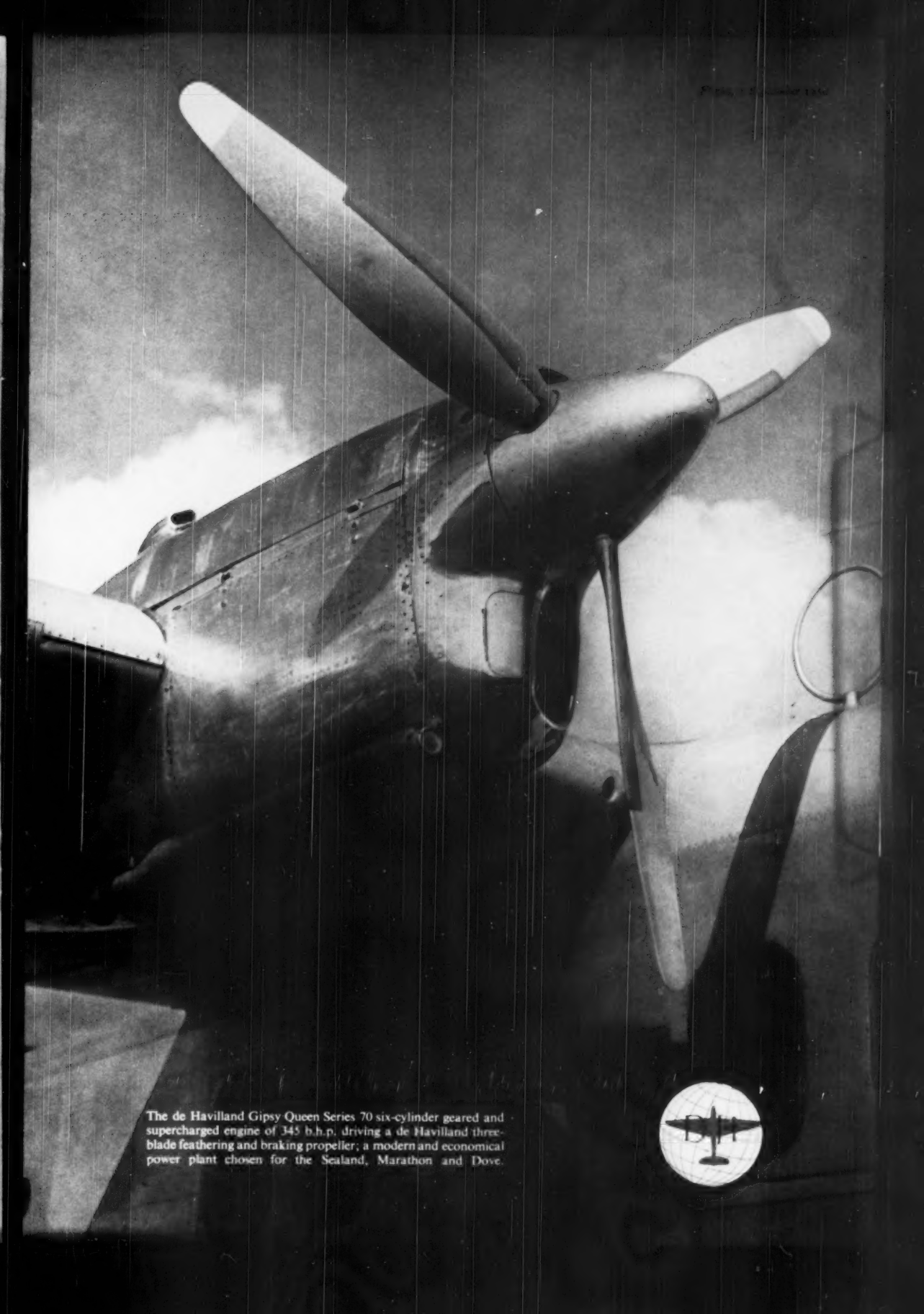
The de Havilland Vampire, chosen by twelve nations as the basis for fighter-force development. Available as interceptor, ground-attack, night-fighter, trainer and naval aircraft. Forerunner of the Ghost-powered Venom high-performance high-altitude aircraft and more advanced designs.



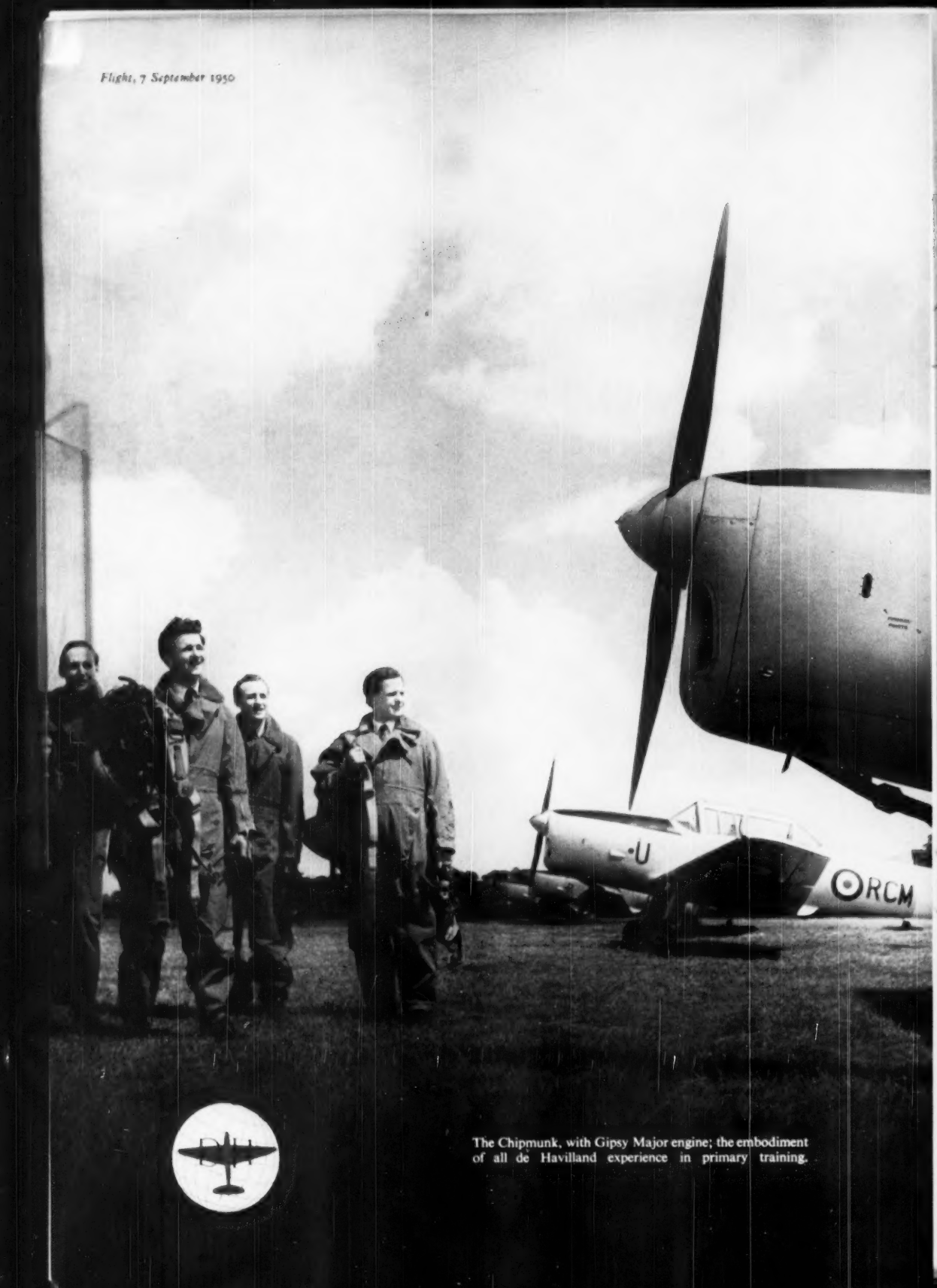
The de Havilland Comet, with de Havilland Ghost turbines; the mainliner of the future.

Performance with economy; the Ambassador's simple, clean, twin-engine formula assures fast yet profitable operation over medium-stage routes.

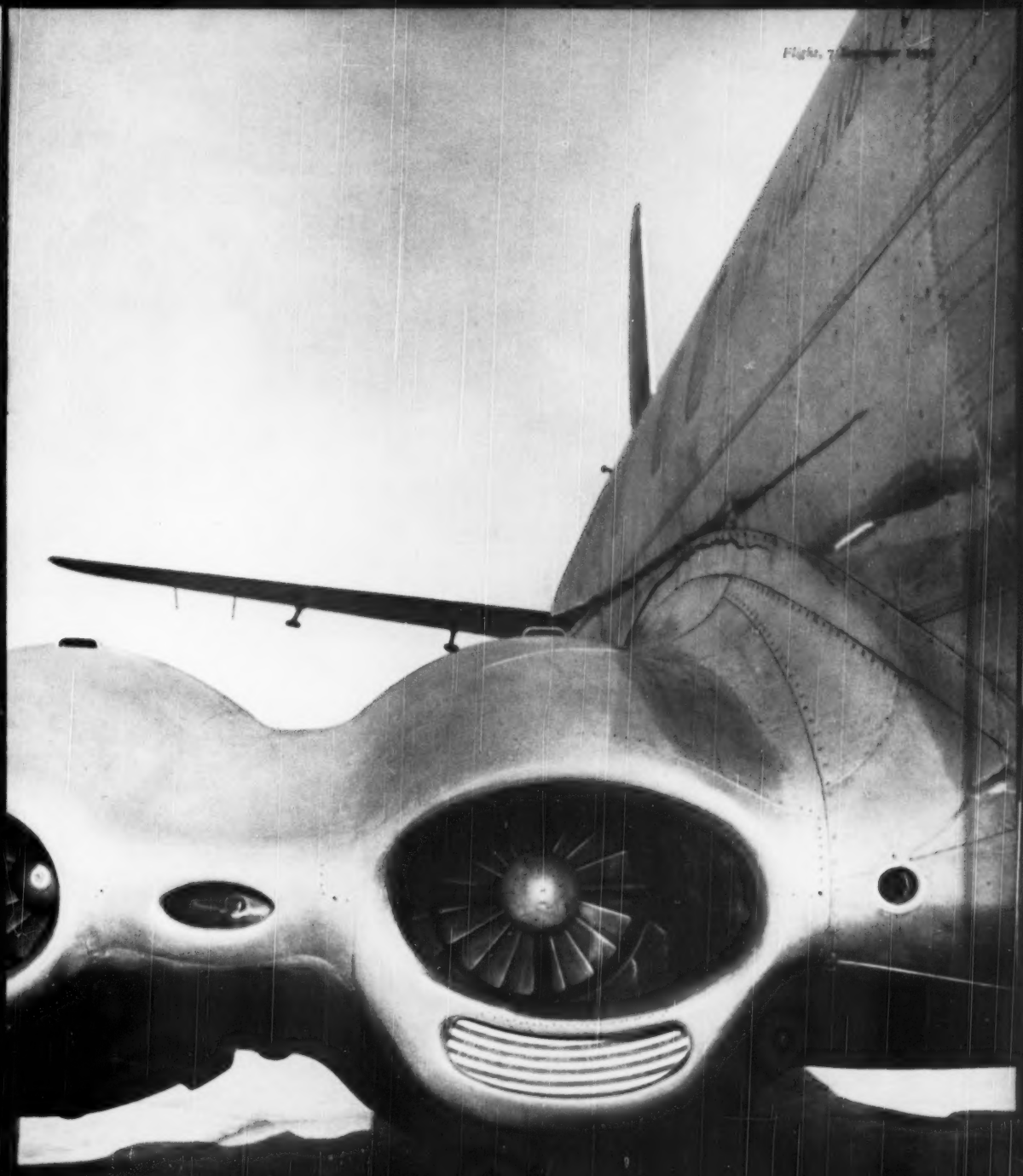
The Heron, with Gipsy Queen 30 engines; an advance in economy, simplicity and take-off capability in an important feeder-line category.



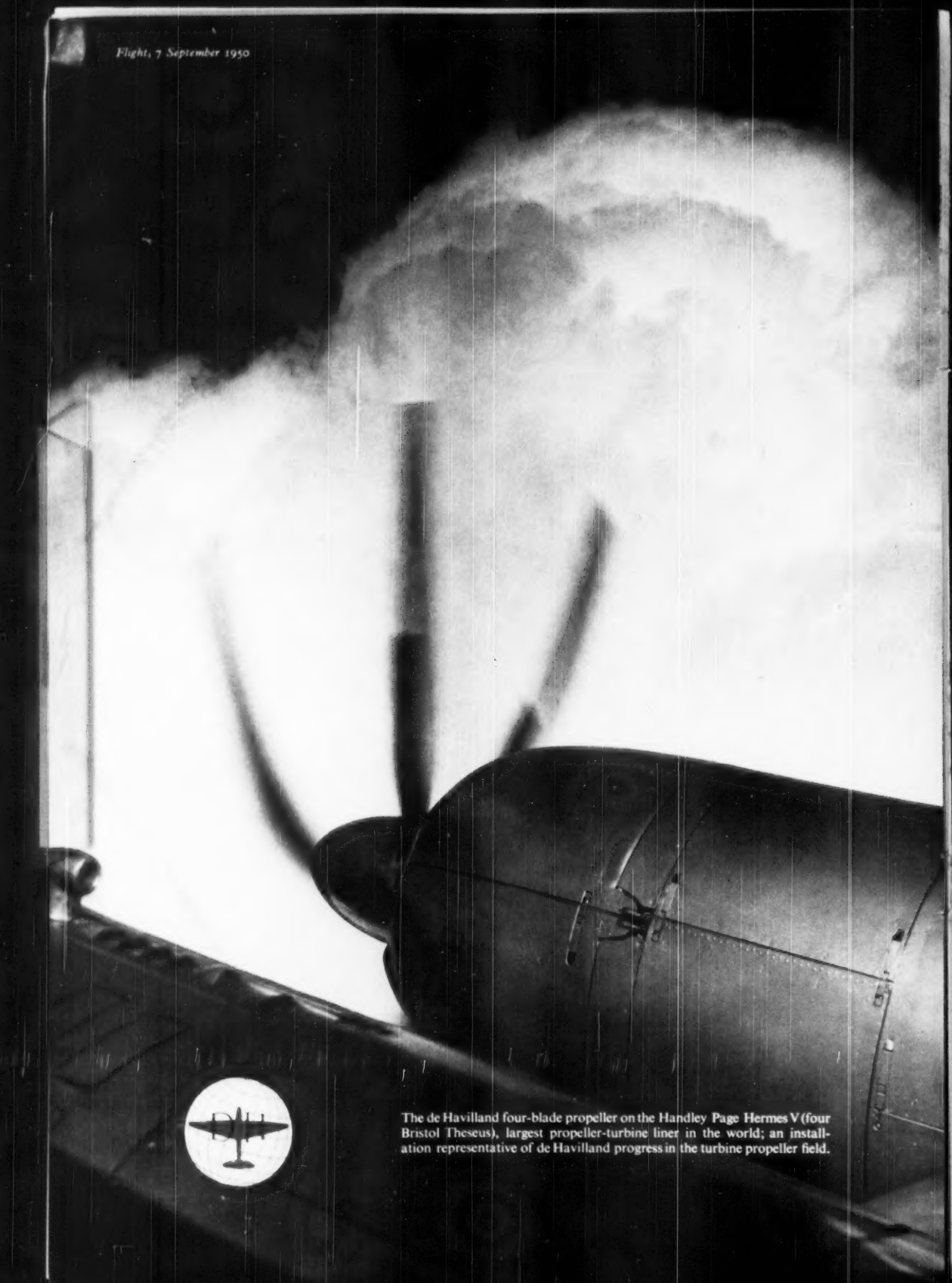
The de Havilland Gipsy Queen Series 70 six-cylinder geared and supercharged engine of 345 b.h.p. driving a de Havilland three-blade feathering and braking propeller; a modern and economical power plant chosen for the Sealand, Marathon and Dove.



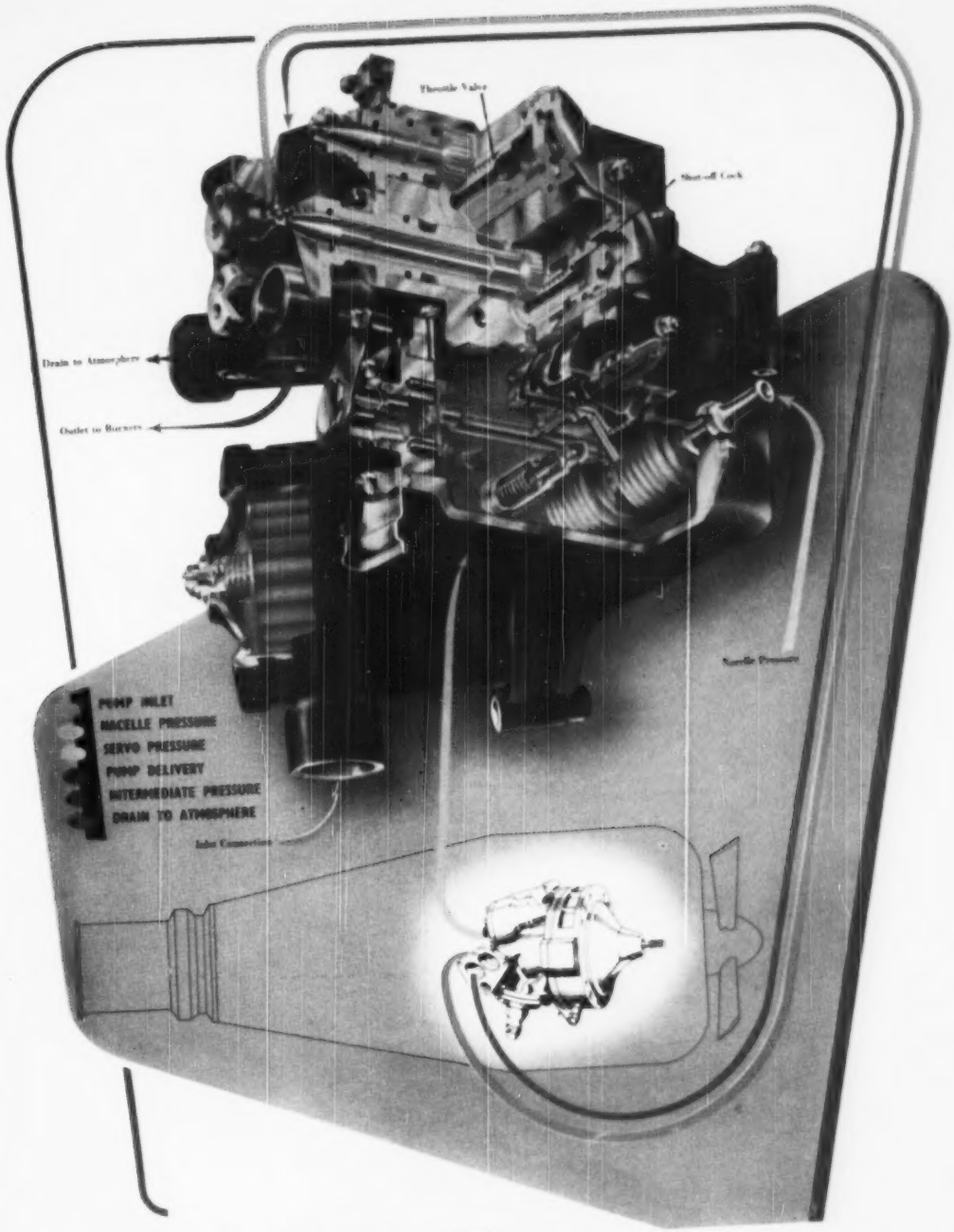
The Chipmunk, with Gipsy Major engine; the embodiment of all de Havilland experience in primary training.



The de Havilland Ghost turbine, combining high performance with valuable installational simplicity; already established in military and civil applications, yet of high development potential.



The de Havilland four-blade propeller on the Handley Page Hermes V (four Bristol Theseus), largest propeller-turbine liner in the world; an installation representative of de Havilland progress in the turbine propeller field.



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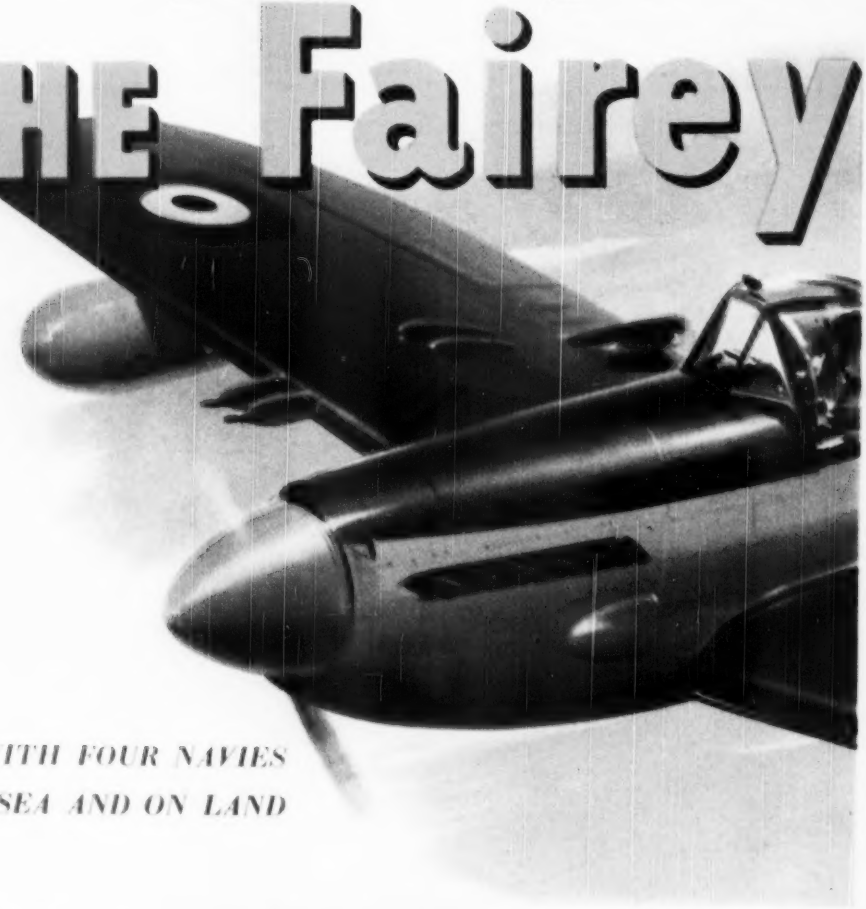

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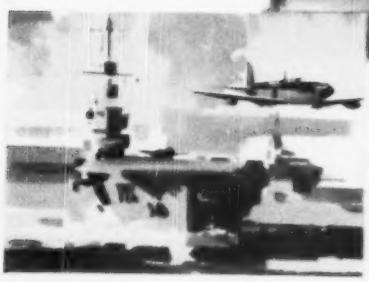

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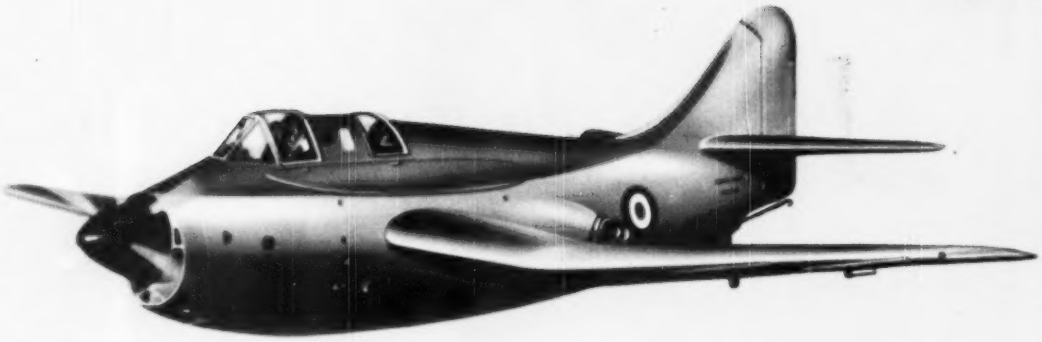

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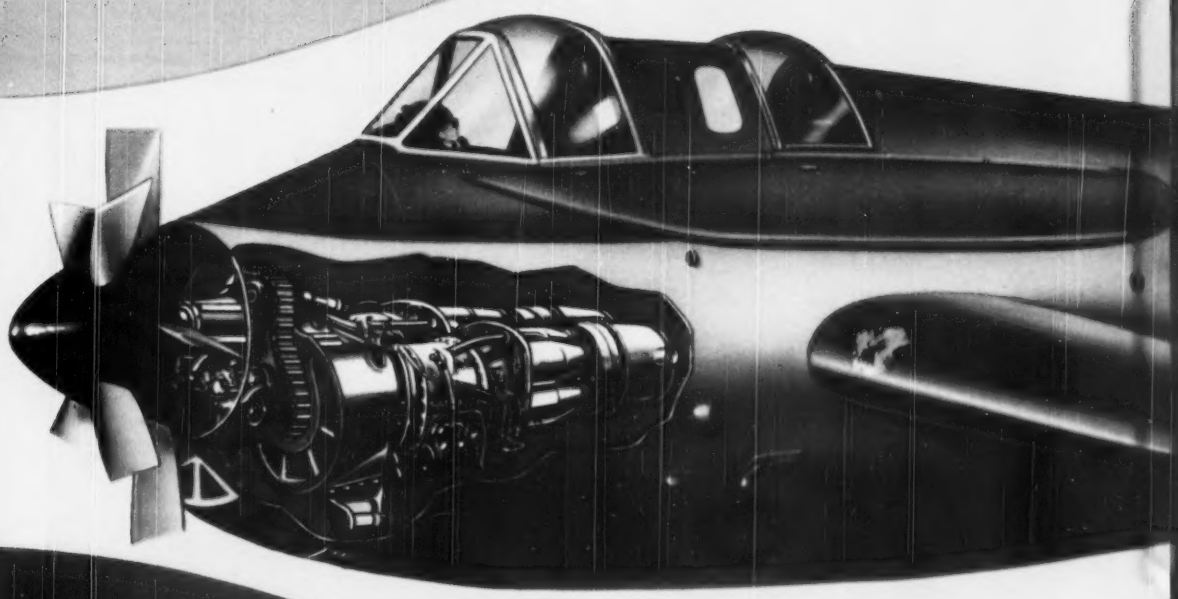

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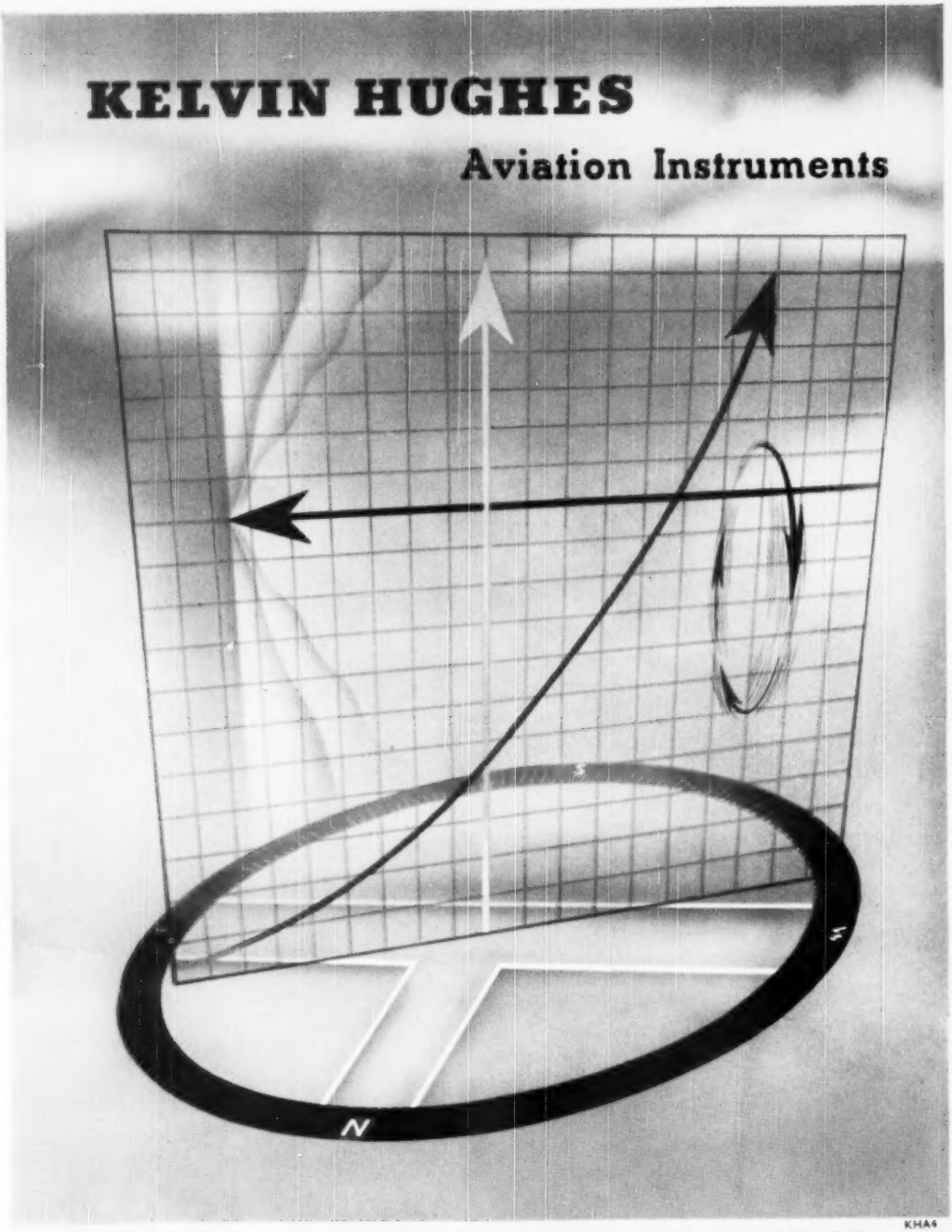

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See Lodge Aviation Plugs on Stand No. 127, S.B.A.C. Flying Display Static Exhibition, Royal Aircraft Establishment, Farnborough, September 5th—10th, 1950.

British Aircraft, 1950

YEAR by year, on the eve of the S.B.A.C. Display, authority is given for new types of aircraft to make their public debut. As this annual review of modern British aircraft goes to press it is impossible to forecast with any worth-while degree of accuracy the number of hitherto secret, or semi-secret, machines which will appear at Farnborough between September 5th-10th, though it is safe to predict that the impressive variety of types represented in the following pages will, by that time, have been appreciably widened. Certainly there will be important new variants of established designs.

As always, it has been our purpose in this survey to present the salient facts about each type for the benefit of everyone attending Britain's great air event, be he a prospective buyer, technician, student, or a member of the interested public. Read in conjunction with data tables elsewhere in this issue, the descriptive text will, it is hoped, prove a valuable medium of reference and recollection. The photographs will serve as a recognition guide to what we believe are the world's finest aircraft.

Auster A.2/45

AN altogether larger and heavier type than the Auster A.O.P.6 and T.7, this prototype Auster is powered by a D.H. Gipsy Queen engine.

Avro Athena

IN experimental versions of the Athena advanced trainer, the A.S. Mamba and R.-R. Dart turboprops have been successfully installed, but the type is most commonly powered with a Merlin piston engine, this being the main distinction of the T.2 version. From the outset the Athena was planned for day and night flying-training, navigation, gunnery, bombing, photography and glider-towing. Servicing and maintenance have been facilitated by broadly sub-dividing (1), articles for which periodic attention is imperative; (2), those likely to require periodic attention; and (3), those expected to give trouble-free service over long periods.

Span, 40ft.; gross weight, 8,554 lb (bombing).

MILITARY TYPES

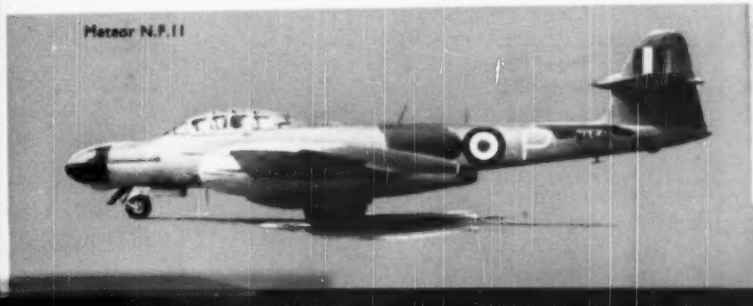
Armstrong Whitworth (Gloster) Meteor N.F.11

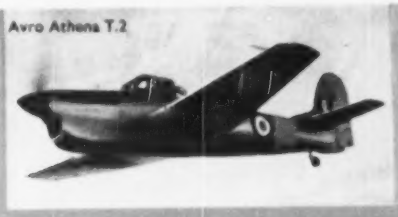
ALTHOUGH the basic airframe of this type is of Gloster design, it has been developed for night-fighter duties by Sir W. G. Armstrong Whitworth Aircraft, Ltd., at whose works it is now in series production for the R.A.F. The extended nose houses radar and the four 20 mm Hispano guns have been transferred to the wings, the outer panels of which are of greater span than those of the Marks 4 and 8 single-seat fighters. Ejector seats are provided for the pilot and radar operator.

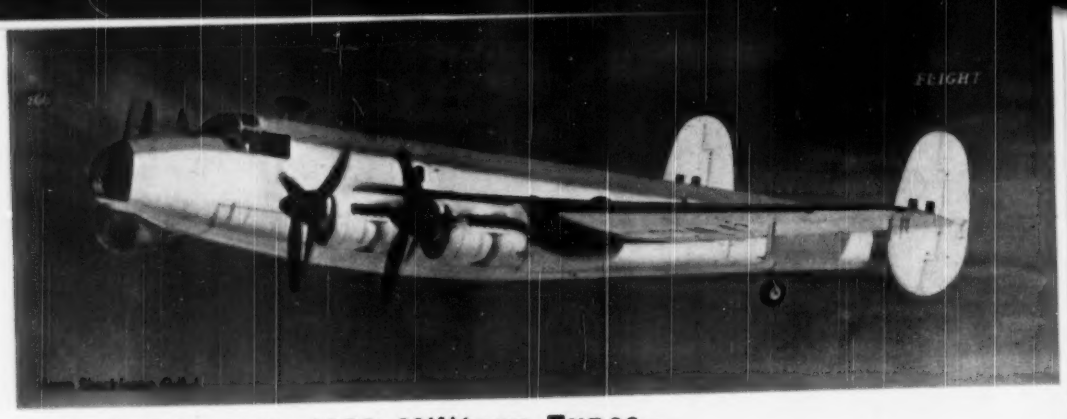
Auster A.O.P.6 and T.7

THE record of the little Auster military monoplanes is too well known to need recapitulation. Whereas the Mark 6 is an "air observation post," the Mark 7 has been developed for *ab initio* training in pilot-instruction and army co-operation, though it can quickly be adapted for A.O.P. duties by removing the cushions from the starboard seat and installing radio in a quick-fitting crate. In the Mark 7 the instrument panel is rearranged to be most beneficial to the pupil.

Span, 36ft.; gross weight, 2,122 lb; max. speed, 122 m.p.h.







British Aircraft, 1950—Military Types—

Avro Anson T.20 Series

CURRENT R.A.F. variants of the ubiquitous Anson military trainer are the T.20 Empire navigational trainer, T.21 home-service trainer, and T.22 radio trainer. Typically, accommodation is provided for a crew of six.

Span, 57ft 6in; gross weight, 10,400 lb; max speed, 171 m.p.h.

Avro Lincoln

THE heavy-bomber forerunner of the Shackleton, described below, the Lincoln (4 Merlins) continues in service.

Avro Shackleton G.R.1

DEVELOPED specifically as for long-range maritime reconnaissance and anti-shipping (especially anti-submarine) duties, the Shackleton is notable for its military-load capacity and spaciousness. It is shortly to go into service with R.A.F. Coastal Command in succession to the Avro Lancaster. The engines are four Rolls-Royce Griffons delivering nearly 10,000 take-off h.p. to de Havilland Hydromatic contra-rotating airscrews. Various armament schemes have been evolved; in the current G.R.1 version defensive fire power is two 20 mm guns in a Bristol dorsal turret. The normal operational crew consists of ten men, for whose sustenance on long patrols a galley is provided. The Shackleton carries very complete radar, long-range navigational and radio equipment and has provision for vertical and oblique photography. An airborne lifeboat is readily accommodated.

Span, 120ft; length, 77ft 6in.

Avro Canada CF-100

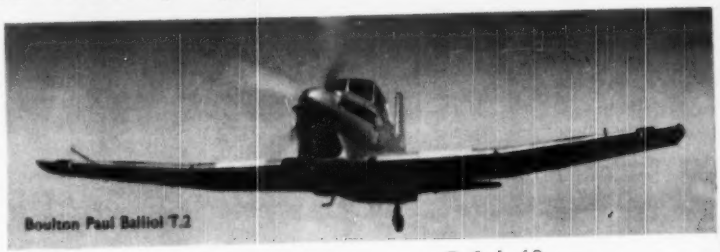
PERFORMANCE has been combined with range and load capacity to an exceptional degree in this all-weather fighter. Two Avro Canada Orenda turbojets may eventually supersede the Rolls-Royce Avons at present installed. An armament of four 30 mm. guns has been mentioned.

Span, 52ft; length, 52ft 6in.

Blackburn and General Aircraft Firebrand

A SINGLE-SEAT dive bomber and torpedo dropper, the Firebrand, with Bristol Centaurus 9 engine, is a standard type in the service of British Naval Aviation.

Span, 51ft 3½in; gross weight, 16,000 lb; max speed, 380 m.p.h.

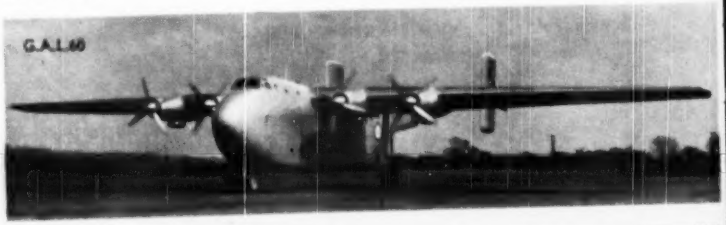

Boulton Paul Balliol T.2

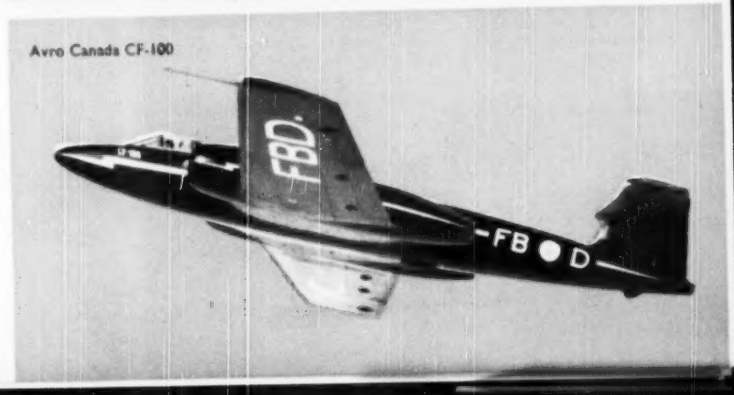
Blackburn and General Aircraft Y.A.5 and Y.B.1

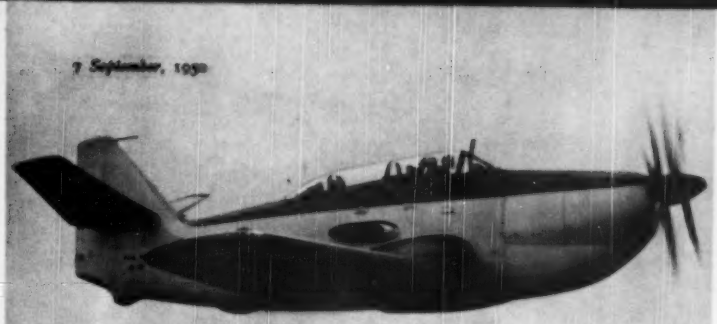
TWO sets of deck-landing trials have been completed by the Y.A.5 anti-submarine aircraft, the piston-engined forerunner of the Y.B.1, which made its initial flight on July 19th this year and which is distinguished from the Griffon-powered Y.A.5 in having an Armstrong Siddeley Double Mamba turboprop. The photograph on the following page shows that the installation of the power unit has been accomplished with an exceptional degree of neatness. The cranked wings have a single fold, thereby minimizing the amount of mechanism required. The makers point out that the height of the aircraft is such as to utilize the maximum space available in the hangar of an aircraft carrier; thus, the loading of weapons into the very capacious bomb-bay is relatively easy.

G.A.L.60

THE maiden flight of this, the largest British military transport aircraft, was made on June 20th this year. The engines are four Bristol Hercules, and the crew, four; other data are span 162ft; length 99 ft 2 in; height 33 ft. It is evident that the airframe is virtually identical with that of the Universal Freighter—a proposed civil variant which has been publicized at previous S.B.A.C. Displays. The civil machine is offered for relatively short-haul freight work from small, undeveloped airfields. A high power loading notwithstanding, the take-off run to 50 ft (zero wind) was calculated as only 970 yd. The available cargo space is 5,760 cu ft, and the uninterrupted internal dimensions are 36 ft x 10 ft x 10 ft. Loading and unloading are facilitated by a built-in hydraulically-operated ramp, and the nosewheel undercarriage allows the floor to remain more or less level under all conditions.


G.A.L.60



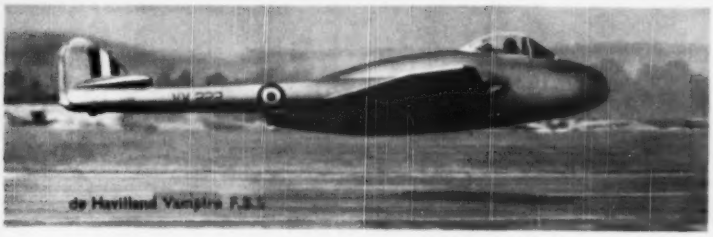


Blackburn and General Aircraft Y.B.1

Bristol Brigand B.1 and Met.3

INTRODUCTION of Brigand B.1 attack-bombers into service with Far East squadrons has greatly increased the R.A.F's offensive power in that area. The Met.3, likewise in R.A.F. service, is generally similar but is employed on specialized meteorological reconnaissance duties. Both types are powered with two Bristol Centaurus engines. The bomber carries 2 x 1,000 lb + 2 x 500 lb bombs or a heavy rocket projectile load, in addition to four fixed 20 mm guns. Bellows-type dive brakes are fitted along the wing trailing-edge.

Span, 72ft 4in; gross weight, 38,000 lb; max speed 358 m.p.h. at 16,000ft.



de Havilland Vampire F.B.5

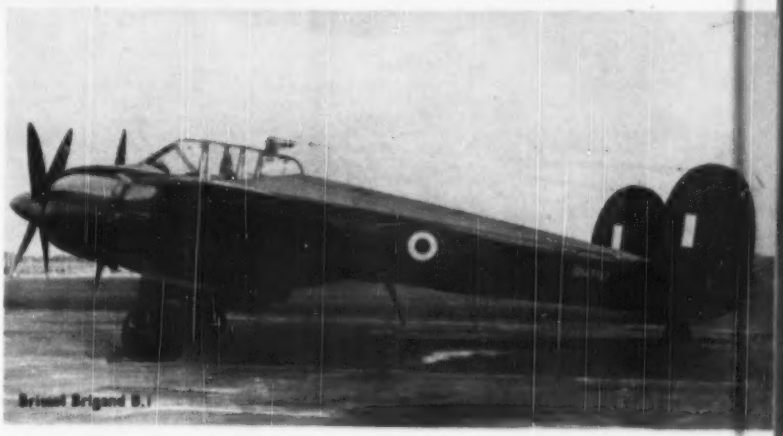
Bristol Type 170 (Military)

ALTHOUGH it has made its name principally in the civil field, the Bristol 170 transport was originally conceived as a military type. A typical load is thirty fully equipped soldiers in rearward-facing seats. The nose doors and rear fuselage doors permit rapid disembarkation.

Boulton Paul Balliol

ANNOUNCEMENT was made during February this year of the adoption of the Boulton Paul Balliol T.2 (Rolls-Royce Merlin) as the standard advanced trainer of the R.A.F. Variants have been flown with the Armstrong Siddeley Mamba turboprop (Mk I) and Bristol Mercury piston engine (P.108). The Balliol meets modern requirements for advanced training—by day or night—in flying, gunnery, rocket-projectile firing, navigation, bombing, photography and glider towing, and is readily adaptable for deck-landing. Robustness and ease of maintenance are especially noteworthy characteristics and the structure is built in easily transportable units of which the following are the chief: power unit; front fuselage (from engine bulkhead to wing trailing-edge); rear fuselage, forward portion (from wing trailing-edge to a joint immediately forward of the tail unit); rear fuselage, aft portion; outer wings; centre wing; tailplane.

Span, 39ft 4in; gross weight, 8,356 lb; max speed, 305 m.p.h. at 11,500ft.



Bristol Brigand B.1

D.H.113 Night Fighter

de Havilland Vampire and Sea Vampire

THE latest British Service-type Vampire is the F.B.5, and the latest Sea Vampire the F.20; both are powered with a Goblin 2. Somewhat higher performances are attained by export Vampire fighter-bombers with the Goblin 3. Armament of the Vampire fighter-bomber is four 20 mm guns and either 2 x 1,000 lb bombs, or 2 x 500 lb bombs (or 2 x 100 gallon drop-tanks) and 8 x 60 lb rocket projectiles. Data for the Vampire F.B.6 are :—

Span, 38ft; gross weight, 12,350 lb; max speed, 548 m.p.h.

D.H.113 Night Fighter

THIS Vampire development made its first appearance at last year's S.B.A.C. Display. It was built as a private venture to meet the demand for a fast two-seater carrying radar and having a high performance at altitude. The power unit is a Goblin 4, and the crew of two have staggered seats with the radar operator's slightly to the rear.

de Havilland Venom F.B.1

Fairey Firefly A.S.5

Fairey Primer

British Aircraft, 1950—Military Types—

D.H. Venom F.B.1

THE Venom is another de Havilland type which made its first appearance at the previous S.B.A.C. Display. By comparison with the Vampire this Ghost-powered fighter-bomber has a new wing, with a reduced thickness/chord ratio and a moderate degree of sweep-back on the leading edge to compensate for the rearward movement of the c.g. brought about by the fitting of the larger power plant. The width and depth of the nacelle remain unchanged. Auxiliary fuel tanks are secured to the square-cut wing-tips; though stressed for full combat manoeuvrability when full they can be instantly jettisoned. Innovations since the type was first seen are the boundary layer "fences" on the wing, and the increased area of the tailplane which now extends beyond the twin booms. The Venom is in quantity production for the R.A.F.

Span, 41ft 9in; length, 31ft 0in.

D.H. Hornets

IN addition to the Hornet F.3 long-range fighter, versions of the Hornet, bearing the name Sea Hornet, have been developed for Naval use. They include the F.20 single-seat fighter, N.F.21 two-seat night fighter/strike leader, and P.R.22 single-seater unarmed photographic reconnaissance aircraft. Two opposite-rotating Rolls-Royce Merlin engines are standard in all marks. In addition to its 4 x 20 mm guns, the Hornet fighter carries 2 x 1,000 lb bombs or two mines, or eight rocket projectiles. Data for the Sea Hornet P.R.22 are:

Span, 43ft; max speed, 467 m.p.h. at 22,000ft.

D.H. Mosquitoes

THE Mosquito Mark 34 (photographic reconnaissance), Mark 35 (bomber), and Mark 38 (night fighter) continue to render excellent service, as do torpedo-reconnaissance Sea Mosquitoes. Data for the Mosquito P.R.34 are:

Span, 54ft 2in; gross weight, 25,500 lb; max speed, 425 m.p.h. at 30,000ft.

D.H. Chipmunk

WITHIN the past year impressive numbers of Chipmunk primary trainers have been delivered for the use of Royal Air Force Volunteer Reserve formations, in replacement of Tiger Moth biplanes. Designed and developed by The de Havilland Aircraft of Canada, Ltd., the Chipmunk has a safety factor of 9 whereas that of the Tiger Moth was 7. Nevertheless the basic tare weight is appreciably lower than that of the biplane. A Gipsy Major engine is standard.

Span, 34ft 4in; gross weight, 2,000 lb; max speed, 143 m.p.h. at sea level.

Fairey Fireflies

THE Firefly F.R.5, N.F.5, and A.S.5 are respectively equipped for fighter-reconnaissance, night fighter, and anti-submarine duties. Basically the type is a two-seat deck-landing aircraft with a Rolls-Royce Griffon 74 engine. The normal armament is 4 x 20 mm guns, supplemented by 2 x 1,000 lb bombs, or 16 x 60 lb rocket projectiles, if required. Where necessary provision is made for sonobuoys or depth charges. In the Mark 6, anti-submarine requirements are accentuated, but the type is generally similar to its immediate predecessors.

In British and foreign service are quantities of Fairey Operational Trainers, developed from "first-line" Fireflies and having the rear seat raised to give the instructor a clear view forwards. The Firefly tug tows a 16 ft. target at speeds up to 296 m.p.h.

Typical data for the Firefly 5 are:

Span 41ft 2in; max all-up weight, 18,096 lb; max speed (fighter) 386 m.p.h. at 14,000ft.

Fairey Primer

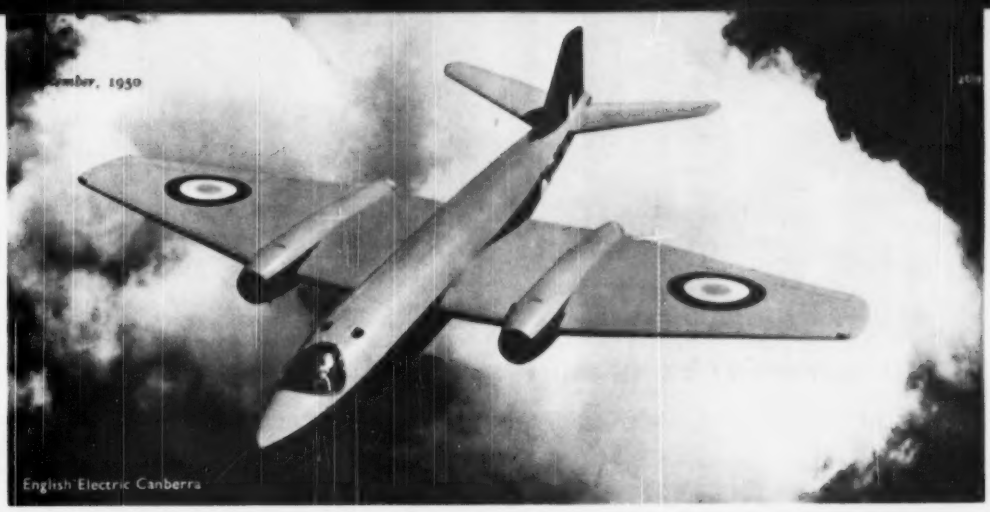
OF metal construction with ribs, formers, etc., of wood, and with fabric covering, the Fairey Primer can be powered with the de Havilland Gipsy Major 10 or Cirrus Major 3 engine. The enclosure for the tandem cockpits has been developed to give the occupant of the rear seat a wide range of vision.

Fairey 17

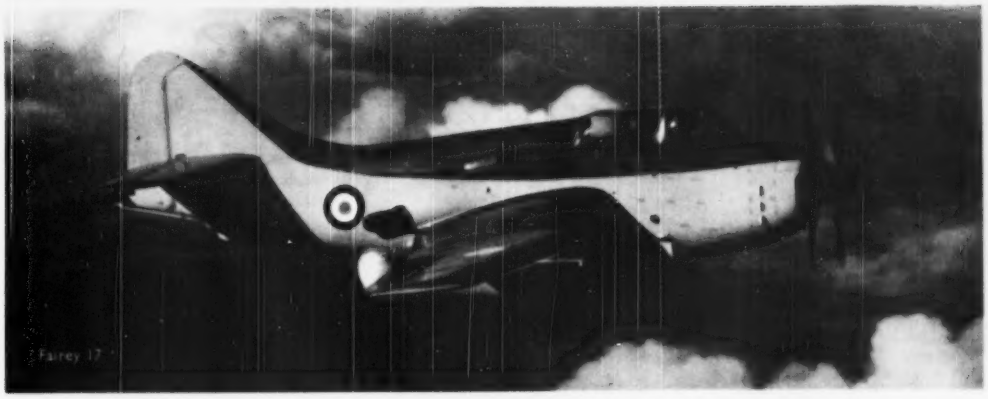
THIS carrier-borne anti-submarine aircraft has numerous distinctions, not the least of which is that of being the first aircraft powered by a turboprop to land on the deck of an aircraft carrier. The power plant is an Armstrong Siddeley Double Mamba, which shows up to particular advantage in an anti-submarine aircraft in allowing the pilot to stop one of the two co-axially mounted units for economical cruising while retaining the ability to use full power at short notice, e.g., on locating a submarine. The fuselage is very capacious, especially in the region of the bomb bay, but aerodynamic design is clean. Due to the novel form of power plant and the depth of the fuselage, it has been possible to locate the pilot's cockpit very far forward in the nose.

de Havilland Chipmunk

de Havilland Sea Hornet N.F.21



English Electric Canberra



Fairey 17

English Electric Canberra

THE Canberra B.2 bomber, as now in production for the Royal Air Force, differs from the prototype demonstrated at the previous S.B.A.C. Display in having a redesigned, partially transparent, nose. The essential design features, however, remain the same. Especially notable is the wing, characterized by a low aspect ratio, extremely smooth construction, and a moderate thickness/chord ratio. To a large degree these qualities endow the Canberra with its exceptionally high performance at altitude, upon which it relies for its defence. It may be noted that sweep-back was not found to be necessary at the Mach numbers which could be obtained when carrying a useful military load with the thrust likely to be available from the twin Rolls-Royce Avon turbojets within the life of the airframe, though this thrust will be very high.

Its compactness notwithstanding, the Canberra is a capacious machine, and its internal tankage can be supplemented by two large wing-tip tanks. Technical observers at Farnborough will not fail to notice the variable-incidence tailplane, designed to give positive control at high Mach numbers, and the "finger" type dive brakes on the mainplanes, outboard of the nacelles.

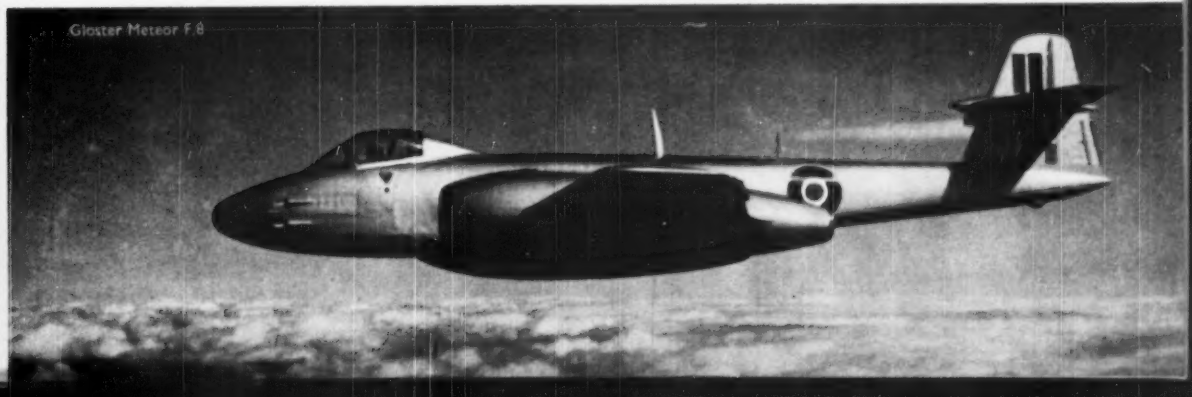
Several prototypes of the Canberra are already flying and it is evident that the performance and capacity of the type are such as to suit it for development in many military roles. Manoeuvrability is of an exceptionally high order, and all normal fighter manoeuvres, including upward rolls, are possible.

Span, 64ft; length, 65ft 6in; height, 15ft 7in.

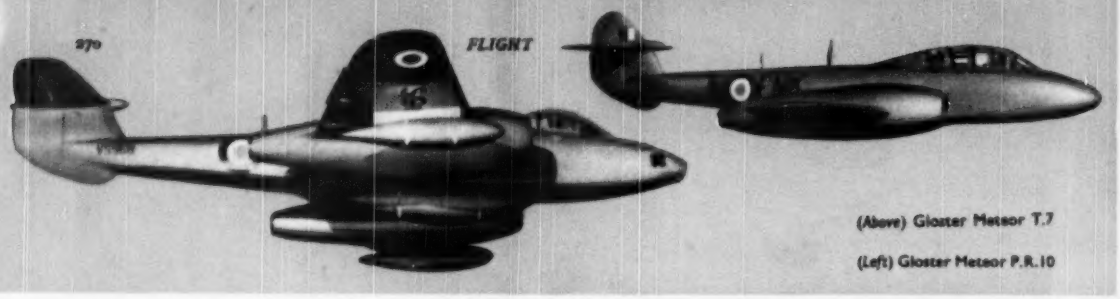
Gloster Meteor 8

THE newest development in the line of Gloster single-seat jet fighters, this mark of Meteor appears to display an all-round superiority in performance and handling qualities over its forerunners. Characteristics which distinguish it from the widely-used Meteor 4 include a lengthened fuselage, redesigned tail unit, and an improved cockpit enclosure, electrically opened and closed by a push-button. A Martin-Baker ejector seat is standard equipment. Two under-wing auxiliary tanks can be fitted to supplement the internal tankage and ventral tank. The standard armament of 4 x 20 mm guns is retained (with provision for bombs or rocket projectiles) and as on previous marks, the two turbojets are Rolls-Royce Derwents.

Span, 37ft 2in; length, 44ft 7in; height, 13ft 10in.



Gloster Meteor F.8



(Above) Gloster Meteor T.7

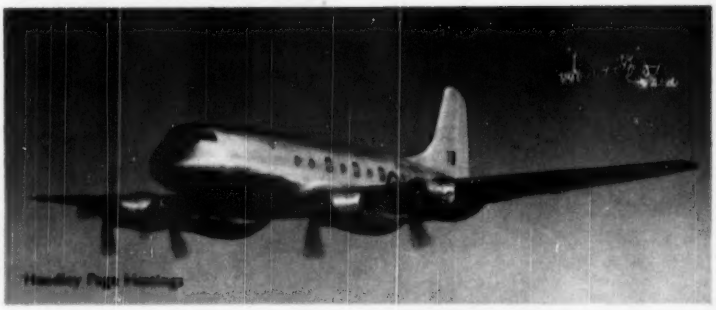
(Left) Gloster Meteor P.R.10

British Aircraft, 1950—Military Types—

Gloster Meteor T.7

IN performance—especially in climb—the Meteor T.7 two-seater trainer is unapproached by any aircraft in its class. A direct development of the Meteor 4 fighter, it is an excellent medium for introducing pilots to the handling and navigation of jet aircraft having speeds of 600 m.p.h. or over. An ultimate factor of 9g at all speeds up to 600 m.p.h. is claimed by the manufacturers, in conjunction with a Mach number up to 0.82; a Mach reading of 0.85 has, in fact, frequently been obtained with safety. No armament is carried, but provision is made for a camera gun and gyro gunsight.

Span, 37ft 5in; gross weight, 14,000 lb; max speed, 585 m.p.h.



Handley Page Hastings

Gloster Meteor F.R.9 and P.R.10

THESE two new versions of the Derwent-powered Meteor are intended respectively for armed fighter-reconnaissance and unarmed high-altitude photographic reconnaissance. The fuselage nose has been redesigned in both cases to incorporate the cameras. In the extreme nose is a flat window, allowing photography in a forward and downward direction and there is one window on each side further aft. The F.R.9 carries the standard Meteor armament of 4 x 20 mm guns. To meet the requirements of high altitude and long range the P.R.10 has wings of longer span (43ft) with rounded tips, as on the Mark 11 night fighter. In addition to the cameras in the nose portion, this variant carries other photographic equipment in the rear fuselage. For the attainment of maximum range, wing drop tanks are carried in addition to the large ventral tanks.

Handley Page (Reading) H.P.R.2

Handley Page Hastings C.2 and Met.1

THE present production version of the Hastings military transport (four Bristol Hercules engines) is the C.2. It incorporates improvements suggested by experimental flying and by squadron service of Hastings C.1s in varied operational and climatic conditions, including intensive flying on the Berlin Air Lift. The makers claim that simplified manufacture and maintenance, a reduction in airframe weight, an improvement in flying characteristics, and greater comfort, and convenience for air crew and passengers have been achieved; moreover, the maximum all-up weight has been increased to 80,000lb, a figure which permits a disposable load of 20,300lb. For operations requiring a minimum of equipment, a load of ten tons is possible and an increase in fuel tankage allows a maximum still-air range (light load) of 4,250 miles.

Hawker P.1081

Handley Page (Reading) H.P.R.2

THIS is a new basic trainer, designed for world-wide service in all conditions of temperatures (−28 deg C to + 41 deg C) and humidity. The engine is an Armstrong Siddeley Cheetah 17 and the airframe is of all-metal construction throughout. Special attention has been paid to servicing, and the entire cockpit can be inspected and maintained from the ground, through floor panels.

Hawker P.1081

NEWEST and fastest Hawker jet fighter the P.1081 made its first flight on June 19th, this year; six days later it was demonstrating high-speed aerobatics at the Antwerp International Air Display—a testimonial indeed, to the quality of its design. The photograph here shows that the type is closely related to the P.1052, the chief visible alteration being the substitution of a tail jet orifice for the twin outlets as used on previous Hawker jet fighters. This more orthodox layout should permit the use of an afterburner for the Rolls-Royce centrifugal-flow turbojet. (A Nene is installed at present, but there is obviously no reason why the more powerful Tay should not be substituted). A second prominent distinguishing feature is the swept-back empennage, incorporating a variable-incidence tailplane.

It should be noted that, notwithstanding its extremely high speed, the P.1081 retains a generous wing area, which confers a moderate landing speed and tractable handling qualities at high altitude.

Span, 31ft 6in; length, 37ft 4in.

Hawker P.1052

THIS swept-wing research fighter is a development of the P.1040 and Sea Hawk formula and, as already observed the forerunner of the P.1081. Construction is almost identical with that of the Sea Hawk, but the wing is swept back at an angle of 35 degrees. The greater wing chord has enabled deeper spars to be employed, considerably alleviating the increased bending and torsional problems associated with back-swept wings. The fuselage frames to which the spars are attached have been strengthened, and the wing-root air intakes are slightly different from those on the Sea Hawk in order to conform with the modified wing design.

Span, 31ft 6 in; length, 39ft 7in; height, 10ft 6in.

Hawker Sea Hawk F.1

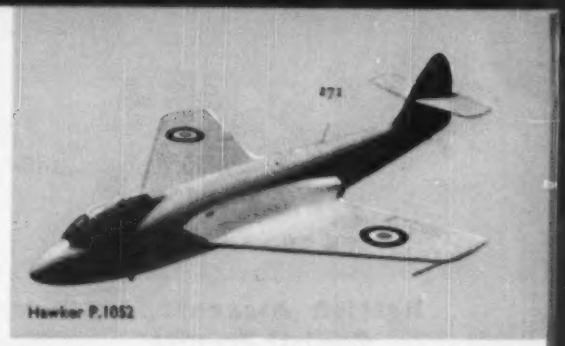
DEVELOPED specifically as a high-speed high-altitude Naval interceptor, the Sea Hawk F.1 is powered by a single Rolls-Royce Nene turbojet, the intakes of which are situated in the leading edge of the wing, discharging at low velocity into a plenum chamber. Aft of the turbine the jet pipe is bifurcated, and pipes are led to exits on the wing roots. This arrangement is claimed greatly to reduce the frictional loss associated with long intake and exhaust systems, and at the same time to afford valuable space for equipment and tankage fore and aft of the power plant. An unusually smooth blending of the wings and fuselage has been obtained by arching the front and rear spars of the inner wings around the power plant bay so that they are integral with the centre fuselage portion. The outer wings have front and rear spars and a leading-edge shear attachment, inter-spar ribs and a heavy-gauge skin to give the required stiffness. Thus the internal structure has been greatly reduced with a view to achieving lightness and a skin surface relatively free from riveting. The outer wings are attached to the stub wings by two hinge-fittings with automatic locks and a spigot bearing in the leading edge; they are power folded. Naval equipment includes retractable arrester hook and single-hook type catapult fitments. The pressurized cockpit has a Martin-Baker ejector seat; the canopy can be jettisoned in conjunction with the seat or alone.

Span, 39ft; length, 39ft 7in.

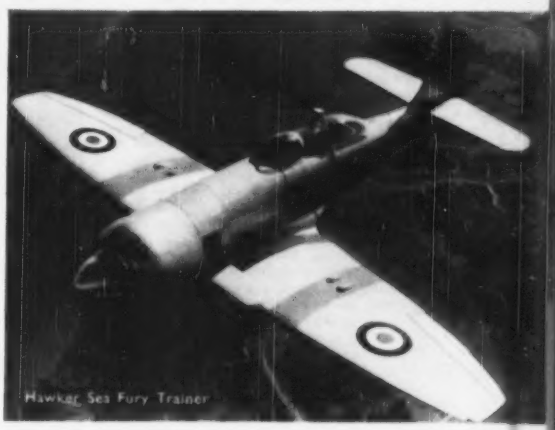
Hawker P.1040

THIS designation applies to a straight-wing land-based fighter generally similar to the Sea Hawk but having non-folding wings.

It was the forerunner of all the Hawker jet fighters here described.



Hawker P.1052



Hawker Sea Fury Trainer

Hawker Sea Hawk F.1

Hawker Furies

THE land-based Fury is essentially similar to the Sea Fury, except that the wings are not arranged to fold and no Naval equipment is carried. Both versions are notable for their long range and heavy and varied military loads. Four Hispano guns with 580 rounds form the built-in armament; representative external loads are twelve 60-lb rocket projectiles, two 100-1,000 lb bombs, two clusters of anti-personnel bombs, two photoflash bombs, two 500-lb depth charges, two flare containers, two camera containers, two smoke curtain installations, or two "window" launcher containers. Two F.24 cameras—one vertical and one oblique—can be fitted in the fuselage. Mixed variations of external stores can be accommodated for special missions and in certain cases under-wing drop tanks can be carried additionally.

Built in four main sections—engine mounting, centre portion, rear portion, and tail end—the fuselage is recessed on its under-surface to receive the wing. The wing itself is virtually a one-piece structure, although the wings are arranged to fold upward.

There are five fixed, self-sealing fuel tanks which can be supplemented by two 45- or 90-gallon drop tanks.

Span, 39ft 4½in; gross weight, 12,300 lb; max speed, 450 m.p.h. at 20,000ft.

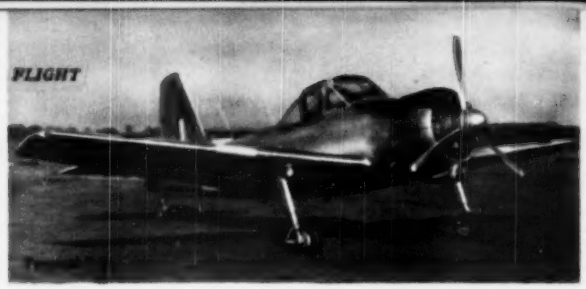
Hawker Fury Trainers

THESE two-seat trainers duplicate standard Fury and Sea Fury features, but incorporate a second seat.

Percival Prince (Military)

REPRESENTATIVE of military versions of the Prince light transport (later described) is the Sea Prince, supplied to the Royal Navy for training and communication.

Percival Prentice T.1



British Aircraft, 1950—Military Types—

Percival Prentice

THE Prentice basic trainer is available in three forms: the T.1 has the 250 h.p. de Havilland Gipsy Queen 32 unsupercharged engine; the T.2 has the supercharged 296 h.p. Gipsy Queen 51; and the T.3 the 344 h.p. Gipsy Queen 70-2. Seating is provided for an instructor and two students. The two forward seats are mounted side by side over the front spar and have a four-inch vertical adjustment for height; the fuselage width at this point is 4 ft. 2in.

The airframe is of stressed skin metal construction throughout. Each outer mainplane has two spars built up with extruded flanges and reinforced plate webs. Leading and trailing edges are made up as complete unit. The fixed undercarriage is of unusually wide track (12ft).

Characteristics of the Prentice T.1 are:

Span, 46ft; gross weight, 4,200 lb; max speed, 148 m.p.h. at sea level.

Percival P.56

TO a recent Air Ministry Specification Percival Aircraft, Ltd., have constructed this new basic trainer, prototypes of which are being delivered to the Ministry of Supply. The first example flew on February 23 this year, and the first 40 hours' flying, completed by mid-May, covered handling trials and all aerobatics, including spinning. The P.56 is reported to be extremely manoeuvrable and in particular to have a very high rate of roll.

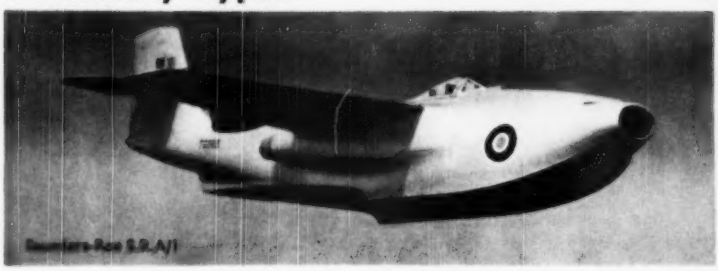
The engine is an Armstrong Siddeley Cheetah 17 of 420 h.p., and equipment is unusually complete for an aircraft of this class, including radio, two-stage amber, and night-flying installations. The Percival design staff have been at great pains to ensure that the airframe is essentially simple and that it may be maintained by semi-skilled personnel without the aid of special tools and with the minimum of ground equipment. Normal day-to-day servicing of engine and airframe is mostly achieved from outside the cockpit and fuselage.

Short Sturgeon T.T.2

ORIGINALLY conceived as a high-speed carrier-borne reconnaissance bomber, the Sturgeon is now being supplied to the Royal Navy as a target-towing and target-simulating aircraft. The Sturgeon T.T.2, as this version is known, has a redesigned nose, a dorsal cupola and provision for photographic plotting equipment. The crew comprises pilot, observer and W/T operator.

Although not the first twin-engined aircraft to operate from an aircraft carrier, the Sturgeon was the first twin-engined machine to be built expressly to a Naval specification for a ship-borne aircraft.

Span, 59ft 11in; gross weight, 21,700 lb; max speed, 402 m.p.h. at 19,000ft.


Saunders-Roe S.R.A/1

Saunders-Roe S.R.A/1

THIS remarkably fast and manoeuvrable flying-boat fighter is still unique. Two Metropolitan-Vickers Beryl axial-flow turbojets are fitted, and their small diameter allows them to be mounted side-by-side within the hull, giving approximately the same width of hull as that demanded by hydromatic considerations. The makers' claim that the side-by-side installation gives particularly good single-engine flying characteristics can well be credited. Cruising economy with increased endurance is obtained during single-engine operation.

The hull of the S.R.A/1 has closely spaced frames and relatively light stringers; the main step is of faired vee form. A single main spar is used for the wing, which is provided with dive brakes and dive-recovery flaps. An ejector seat is installed in the pressurized cockpit, forward of which are four 20 mm. guns with a hinged covering for ease in rearming.

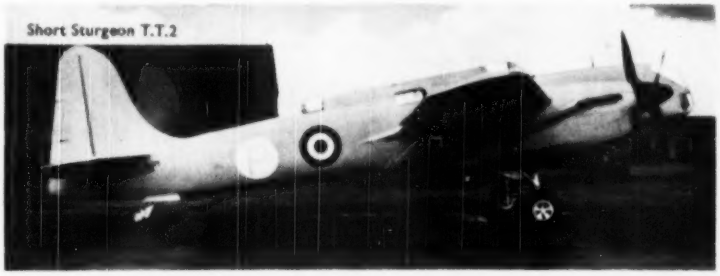
Span, 46ft; gross weight, 16,255 lb; max speed, over 500 m.p.h.

Vickers-Armstrongs Valetta

THE Valetta C.1 is a military troop and freight transport; the C.2 is a special version for carrying 9 to 15 "V.I.Ps" in great comfort and having additional fuel tankage. Both are in service with the R.A.F. In its standard C.1 form the Valetta is suitable not only as a troop and freight carrier but as a paratroop aircraft, glider tug, supply dropper, or ambulance. The main cabin has a total floor area of nearly 400 sq ft; the total volume of the main cabin is 1,565 cu ft. There is a large double door, measuring 5ft 10in in mean height and 8ft 6in in width, to permit the loading of trucks, field guns, etc. The engines are two Bristol Hercules 230s, each of 1,975 h.p. A crew of four—two pilots, navigator and radio operator—is normally carried.

Span, 89ft 3in; gross weight, 36,500 lb; max speed, 294 m.p.h. at 3,500ft.

(Continued after advertisement pages)


Short Sturgeon T.T.2

Vickers-Armstrongs Valetta C.1

THE STORY OF THE HAWKER SIDDELEY GROUP

TODAY, in aviation, we are all pioneers once again. So rapidly have we advanced that once more we are adventuring into the unknown, standing on the brink of great new developments that will lead no one knows where.

What has brought this about? The rapid perfection of the turbo-jet . . . the approach to supersonic speeds . . . the operation of jet aircraft at altitudes which demand pressurization . . . these are but a few of the factors, factors which combine to present new problems which are changing almost daily.

To overcome these problems and ensure a line of successful aircraft for tomorrow, two things are needed—technical experience and resources. Experience, to make best use of the knowledge already gained and still being acquired by unceasing research; resources, to ripen the fruits of this experience into practical application.

It is on these two fundamentals that the Hawker Siddeley Group has been built. In the Group there are many of the best-known firms in the British aircraft industry, with records of achievement reaching back to the days of the pioneers. These companies are now teamed together to provide a pool of experience and resources that would be beyond the practicable scope of any individual firm.

Each of the companies is backed not only by its own experience, but by the wealth of knowledge that has been accumulated by all the others. Each has its own resources, but can freely call upon those of the entire Group. Thus, each separate company has the combined strength of the whole. Each is 'multiplied by nine'. Yet each manages its own affairs entirely.

The Group is the largest organisation in the British Empire—and probably in the world—covering the design and construction of aircraft, aero engines and gas turbines, flying and aeronautical training, and a leavening of non-aviation activities.

Who, then, are the major members of this organization and what briefly are their stories? A. V. Roe, formed in 1910, and one of the oldest aircraft firms in the world, produced the first British full-size aircraft to fly and the long line of R.A.F. trainers which started with the famous Avro 504. The deeds of their 'Lancaster' need no introduction. Hawker Aircraft had its roots in the Sopwith Aviation Company, and the 1914-1918 achievements of Sopwith aircraft are only equalled by those of Hawker machines in the Second World War.

Gloster Aircraft, with a fine record in the manufacture of successful fighters, designed three of the series of Schneider Trophy machines. In 1941 with Sir Frank Whittle, they helped to change the whole

face of aviation by producing the Gloster-Whittle E.28/39, the first jet aircraft successfully developed. Armstrong Siddeley, car pioneers at the beginning of the century, are today in the front rank of specialist car design and gas turbine development. Armstrong Whitworth Aircraft are chiefly remembered for the all-metal 'Siskin' and for the 'Atalanta' airliner—first aeroplane to make civil aviation pay. Air Service Training—Britain's air university—is the largest and best equipped aeronautical training establishment in the world. A. W. Hawksley, formed in 1941 to build the Armstrong Whitworth 'Albemarle', have since provided factory-built houses for more than 20,000 families.

Other members are High Duty Alloys, pioneers in the development of strong, reliable light alloys; and the youngest, A. V. Roe Canada, whose 'Jetliner' transport, CF 100 fighter and 'Orenda' jet engine are already mak ng headlines.

In the Second World War the Group produced no less than a third of the aircraft used by the Royal Air Force and built up an organisation which proved itself capable of remarkable foresight, of rapid technical development and of immense production capacity, demonstrating the great advantages to be gained from the pooling of resources.

What are the benefits that follow from the unique Group method of working? Mutual aid from individual research is one. Without research, progress in aviation is impossible. All companies pursue their individual research programmes and freely circulate their technical reports to all the others. But there is more to it than this. Wind tunnels, structural test apparatus and other items of research equipment are very costly. They may be beyond the financial resources of any one company. Only when viewed from the standpoint of the benefit they would bring to all Group companies do they take on a very different aspect. What is beyond the scope of one may easily be within the sphere of nine.

Another obvious instance is on the production side. One company with a big order may not have sufficient space to deal with it quickly, but other Group factories may be able to help—and will employ on the job workers as skilled and experienced in aircraft construction as those of the first firm. During the war, for instance, Gloster Aircraft built hundreds of 'Hurricanes' for Hawker Aircraft. Since then many Group companies have been helping to build Gloster 'Meteors' and Armstrong Whitworth Aircraft have co-operated in the design of the 'Meteor' night-fighter version and have undertaken its manufacture.

Sometimes a firm needs special and expensive machines and equipment to carry out a particular operation. As with research apparatus, such things may be quite uneconomical in view of the small percentage of time that one firm could keep the machine occupied with its own work alone. In the Group, however, it is often found after discussion that the equipment would be useful to the other firms and that their cumulative work would be sufficient to keep it in full and economical operation.

How, then, is all this co-ordinated so that every one of the members can take the fullest advantage of Group co-operation? First and foremost, the main principle of Group working can be put into two simple words. No centralization! Some 38,000 people are kept in steady employment by the Group, but at the Central Office there are less than 25—from the Chairman to the hall porter. Thus anyone dealing with one of the operating companies is dealing with a company entirely free to make its own decisions and work its own way without having to refer everything of importance to some remote 'head office' where his individual problems are unknown.

The Group functions by calling together from time to time the representatives of the individual companies to discuss their common problems. Great benefits derive, often in intangible ways, from the interplay of ideas that takes place, the exchange of experience, and the many different viewpoints that are brought to bear on the consideration of any one subject. All the Group directors, for instance, regularly get together with the general managers of the operating companies. Naturally, they have a very wide sphere of interest and are likely to discuss almost anything from spreading one company's peak load among the others to the training of leaders for the future. The technical directors and chief designers of the companies also meet regularly. So do the sales managers and those who are responsible for factory production.

But, make no mistake about it, the Group is not too committee-minded. All who need powers to make decisions, have them. And such powers are made infinitely more powerful because they are backed at every stage by the unequalled experience and resources of the entire Hawker Siddeley Group.

A V ROE & CO LTD · HAWKER AIRCRAFT LTD
SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LTD
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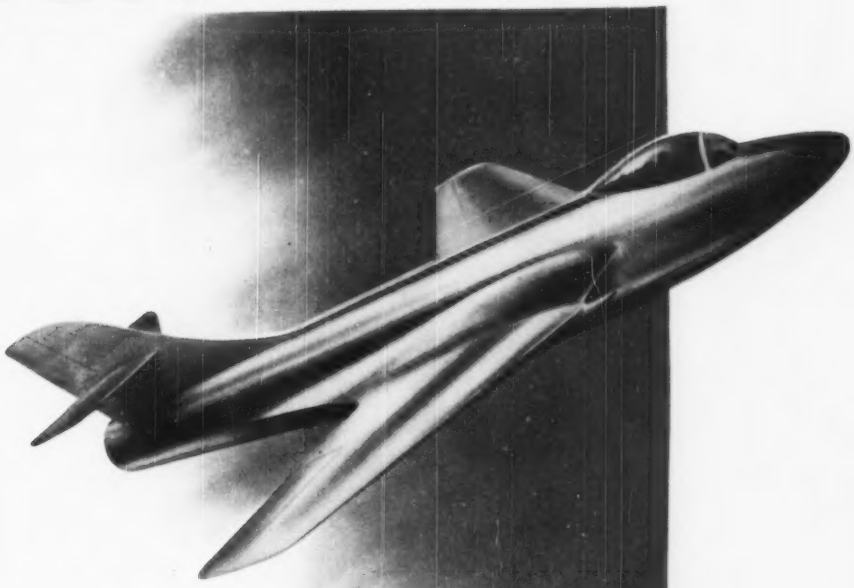
HAWKER SIDDELEY GROUP

FLYING INTO A NEW ERA



High speed research aircraft have enabled Hawker designers to investigate the problems of control and compressibility in the region of the sonic barrier, and to embody in the P.1081 the latest aerodynamic refinements of present day knowledge.

HAWKER

HAWKER AIRCRAFT LIMITED

HAWKER SIDDELEY GROUP

ALL IN THE DAY'S WORK

roles in one—and more to come

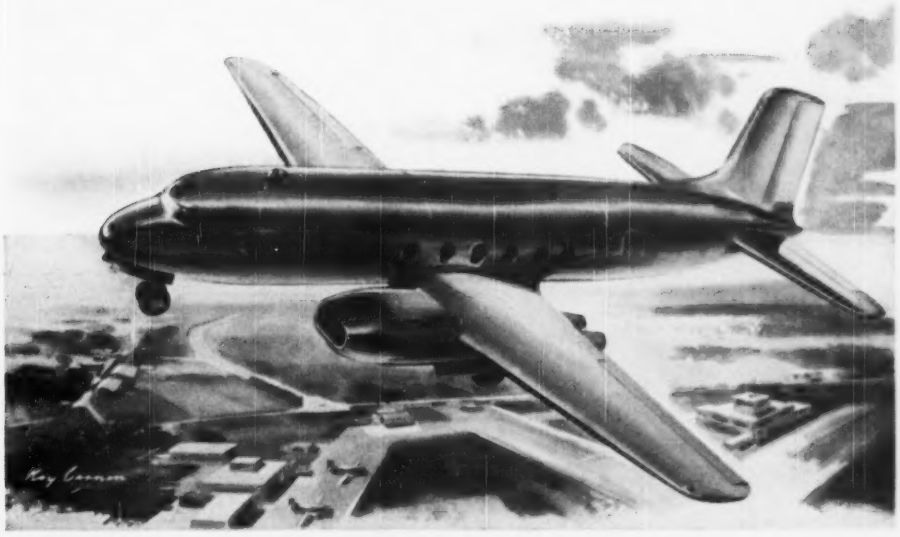
The versatile

GLOSTER METEOR

GLOSTER AIRCRAFT COMPANY LIMITED

HAWKER SIDDELEY GROUP

Each specifically built for investigation of different aspects of high-altitude operation



To the long-range jet aircraft, all aspects of high-altitude operation present many problems which will be scientifically explored by the Avro Ashton. Several of these aircraft are being built for research and development work at heights of 40,000 ft and more. Each aircraft in the series will be devoted to one specialised branch of investigation and will provide many of the answers to the problems which confront the less conventional aircraft of the future now under development.

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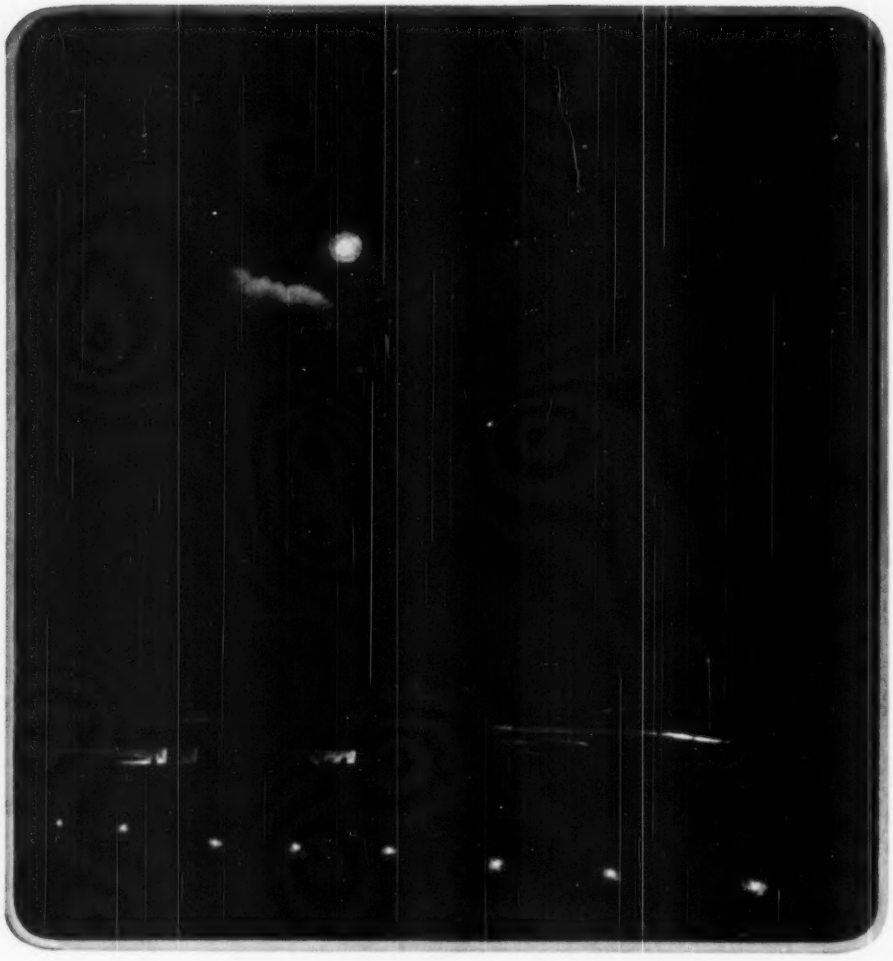
finding the answers to to-morrow's problems

HAWKER SIDDELEY GROUP



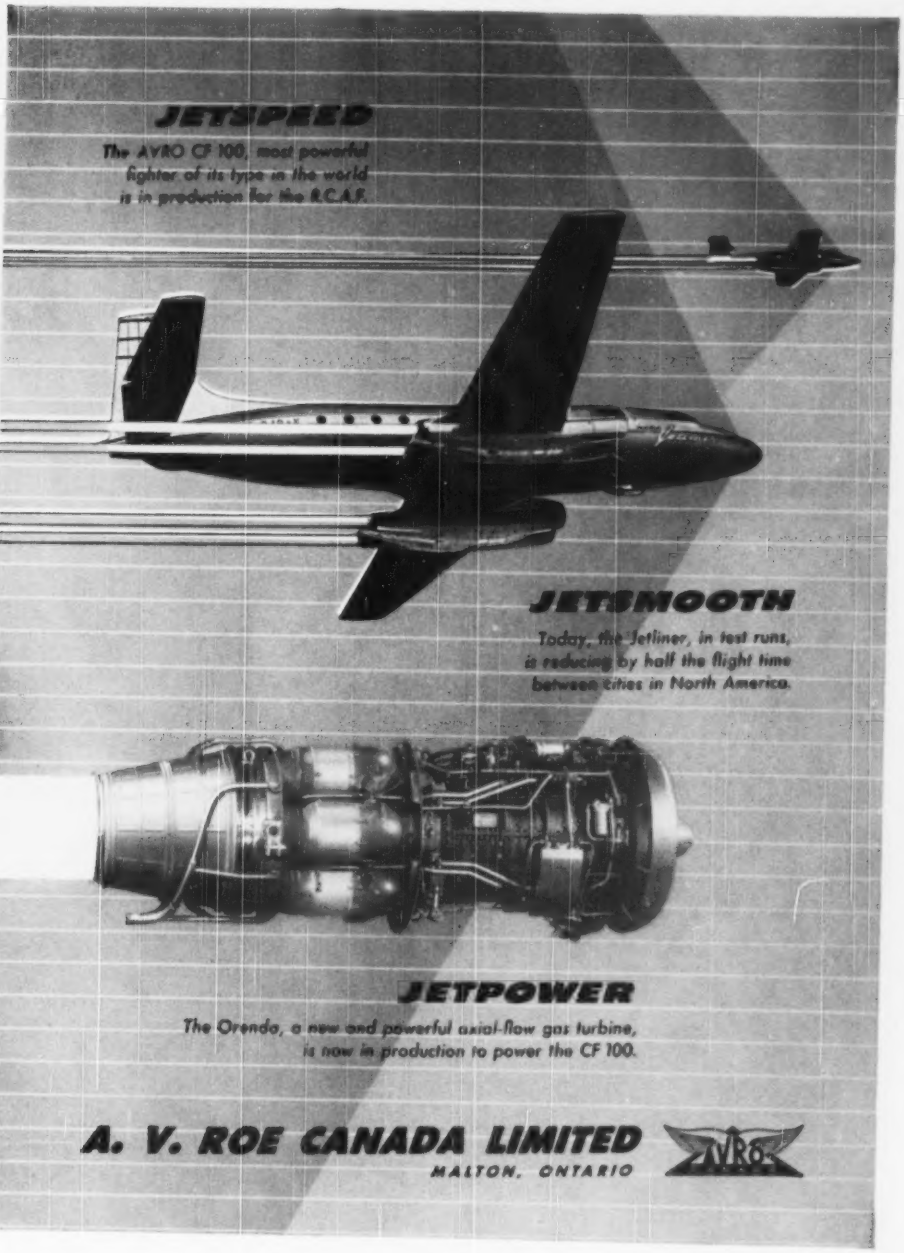
Britain's Newest Night Fighter

A. W. METEOR N.F. 11

AWA

PACE-MAKERS OF PROGRESS

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LTD · BAGINTON · COVENTRY


JETSPEED
The AVRO CF 100, most powerful fighter of its type in the world is in production for the R.C.A.F.
JETSMOOTH
Today, the Jetliner, in test runs, is reducing by half the flight time between cities in North America.
JETPOWER
The Orenda, a new and powerful axial-flow gas turbine, is now in production to power the CF 100.
A. V. ROE CANADA LIMITED
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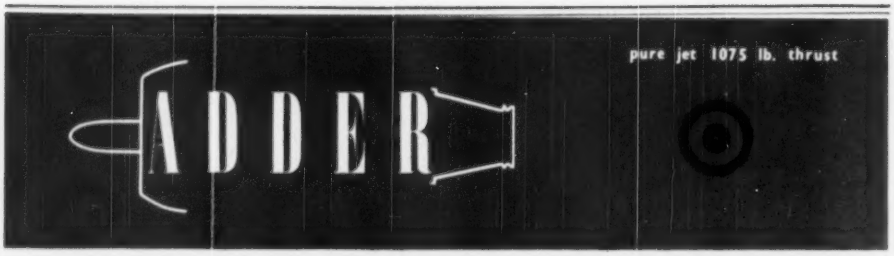
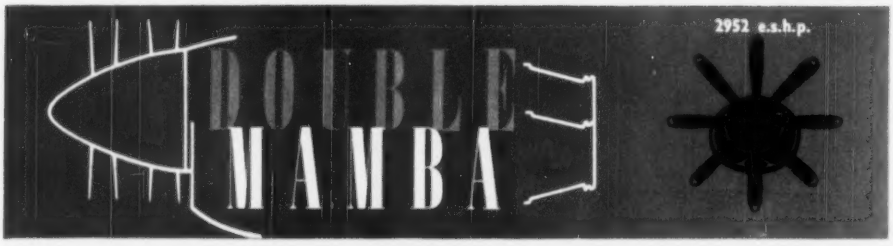
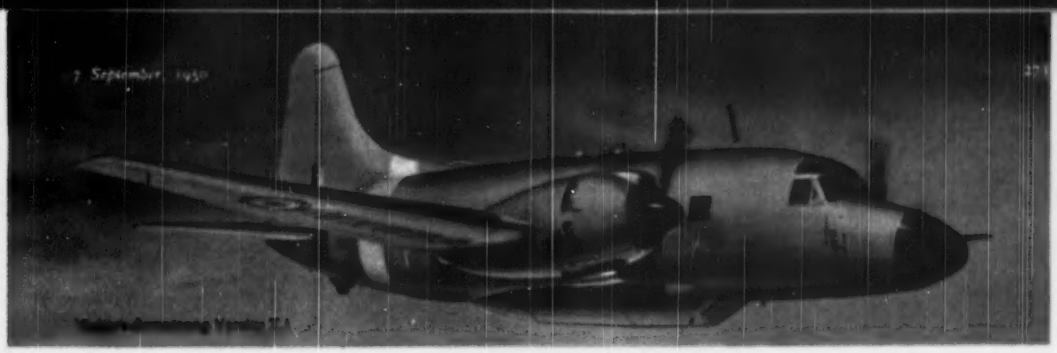
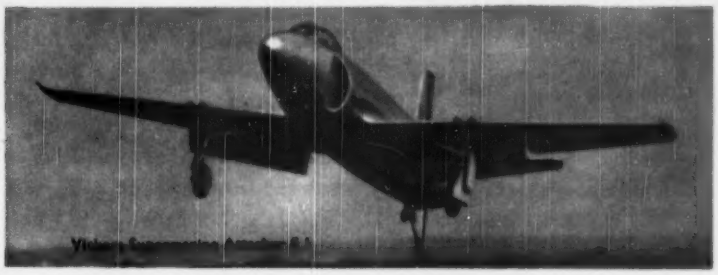




ARMSTRONG SIDDELEY MOTORS LIMITED • PARKSIDE • COVENTRY





British Aircraft, 1950—Military Types—

Vickers-Armstrong Varsity T.1

A "FLYING CLASSROOM" in the true sense of the term, the Varsity (two Hercules) has complete facilities for training in piloting, air navigation, bomb aiming and radio/radar work. Endurance and equipment are such that adequate time and facilities are available for the training of all crew members during a single flight, and since no conversions are necessary to fit the aircraft for alternative roles, it is at all times ready to meet variations in a training programme.

On the flight deck are two pilots' seats, with dual controls. Further aft are the wireless operator and pupil, and behind them the radar navigating station for two pupils and an instructor. There are seats for four reserve trainees towards the rear of the cabin. An underslung nacelle accommodates the bomb-aimer pupil and instructor, and 24 25-lb practice bombs. Operational equipment includes a flare chute, flare and flame-float stowages, camera and a 3-ft H2S navigation scanner.

Span, 95ft 8in; max. all-up weight, 37,500lb; max. speed, 288 m.p.h. at 10,000ft.

Vickers-Supermarine Attackers

THE deck-landing Attacker jet fighter, powered by a Rolls-Royce Nene turbojet, is now in production for the Royal Navy. This Naval version differs from the earlier landplane prototypes in having lift spoilers, arrester hook and long-stroke undercarriage struts. When used in conjunction with the large trailing-edge flaps, the lift spoilers give a high rate of descent and this combination enables high engine r.p.m. to be maintained during the approach. The throttle need not be touched until the aircraft is arrested. Tanks in the fuselage and wings give a capacity of 293 gallons, but range can be increased by the addition of a 250-gallon ventral drop tank. The cockpit is well forward and is pressurized for a differential of 3½ lb/sq in. Provision is made for an ejector seat.

On July 22 a standard Attacker was victorious in the S.B.A.C. Challenge Cup race at an average speed of 533 m.p.h.

Designs exist for a two-seat trainer version of the Attacker with tandem ejector-seats. Data for the standard Attacker fighter are:

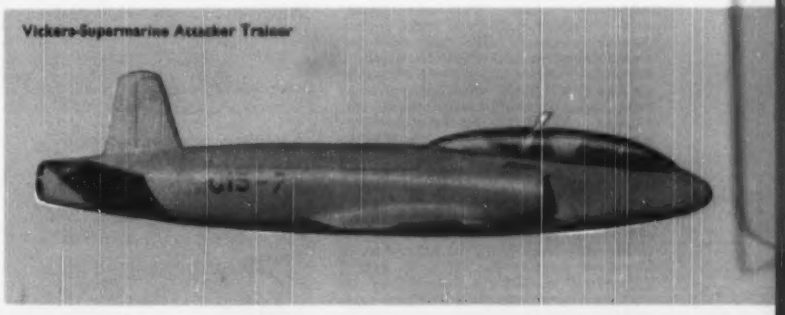
Span, 26ft 11in; normal all-up weight, 11,750lb; max. speed, 583 m.p.h.

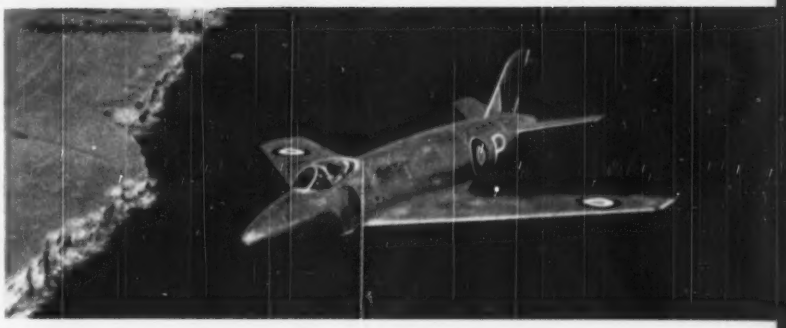
Vickers-Supermarine 510

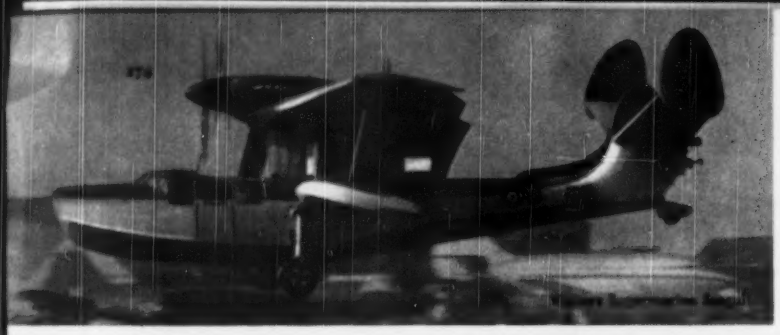
THOUGH retaining the tail-down undercarriage and the fuselage of the Attacker, this high-speed research fighter is distinguished by its back-swept wings and tail surfaces. It has been constructed to investigate the problems associated with flight at high subsonic and supersonic speeds and, like the Attacker, is powered with a Rolls-Royce Nene turbojet. The quarter-chord sweep-back of the wings is 40 deg, and public demonstrations during the past two years suggest that low-speed tip-stalling characteristics are good. The aileron control system is unusual in that a Servodyne unit is fitted in the cockpit and, in addition to this power assistance system, each aileron has a spring tab. The effectiveness of this aileron control system has been proved by frequent demonstration of an uninterrupted series of high speed slow rolls.

It is noteworthy that the wing area of the 510, at 273 sq ft, is greater than that of the Attacker; it may therefore be presumed that handling characteristics at height are good.

Span, 28ft 8½in; length, 28ft 11in.







British Aircraft, 1950—Military Types—

Vickers-Supermarine Seagull

SINCE its appearance at the S.B.A.C. display last year the Seagull amphibian flying boat has (subject to official confirmation) broken the world's 100-km closed-circuit record for aircraft of its class, with a speed of 241.9 m.p.h. The engine is a Rolls-Royce Griffon 29 driving a contra-rotating airscrew. Technically, the most notable feature of the Seagull is its variable-incidence wing, with inter-connected full-span leading-edge slots and slotted flaps. The wing is set at the optimum angle for take-off and in level flight may be adjusted to reduce the drag of the hull. Having been designed for carrier operation, the Seagull has folding wings, which reduce its breadth to 23ft 6in. Although the prototypes are equipped for air/sea rescue work, the type was designed with naval reconnaissance and fleet spotting in view.

Span, 50ft 6in; normal all-up weight, 14,000lb; max. speed, 260 m.p.h. at 11,800ft.

Westland Wyvern T.F.2

NOW in production for strike squadrons of the Royal Navy, this single-seat torpedo fighter is powered by an Armstrong Siddeley Python turboprop unit driving an eight-blade Rotol contra-rotating airscrew. The bifurcated jet-pipes emerge on each side of the fuselage, below the cockpit and slightly aft of the pilot's seat. Initial deck-landing trials have already been completed in the Channel. The many problems encountered in the development of the Wyvern for carrier operation entailed a great deal of research and development work not only by the Westland Company but by Armstrong Siddeley, who were obliged to develop an entirely new type of control system so that the Python could be accelerated from idling to full power in about two seconds, and also be capable of responding quickly and accurately to very small throttle movements. The aerodynamic cleanness of the Python installation and the intake location are apparent in the photograph.

Detailed particulars of the Wyvern T.F.2 are not available, but the airframe is obviously similar to that of the piston-engined T.F.1 which, with a Rolls-Royce Eagle 24-cylinder engine, attained a maximum speed of 455 m.p.h. The earlier mark had an armament of one 20-in torpedo or one 2,000-lb bomb or eight 60-lb R.P.s, in addition to four wing-mounted 20 mm guns.

The laminar-flow wings are hydraulically folded to an overall width of 18ft for carrier stowage.

Span, 44ft; length, 42ft 3in.

Westland Wyvern T.3

THE T.3 variant of the Wyvern is a two-seater development of the single-seat torpedo fighter, equipped for dual-control training and likewise powered with an Armstrong Siddeley Python turboprop. The separate cockpit enclosures are connected by a transparent fairing, and the instructor, who occupies the rear seat, is provided with a periscopic mirror. Though the aerodynamic drag of this trainer Wyvern is evidently greater than that of the single-seater, performance is exceptionally high, and the aircraft should prove a most valuable medium for the initiation of pilots into the handling of very powerful turboprop units.

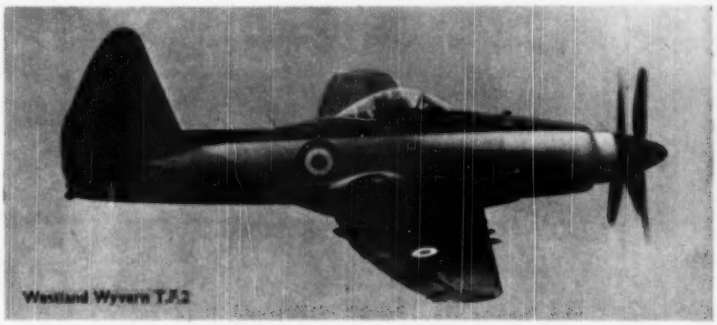
Westland-Sikorsky Dragonfly (S-51)

ALTHOUGH this well-established helicopter is best known for its varied civil applications, it is also a valuable adjunct to military and naval air forces; the name Dragonfly, in fact, applies to the British Service version. Various conversion schemes—e.g., the addition of litters for stretcher cases—are possible in addition to the standard pilot-and-three-passenger layout. The cabin is wide enough (4ft 8in) for the passengers to be seated side by side. Other internal dimensions are: cabin length, 8ft 4in depth, 4ft 3in.

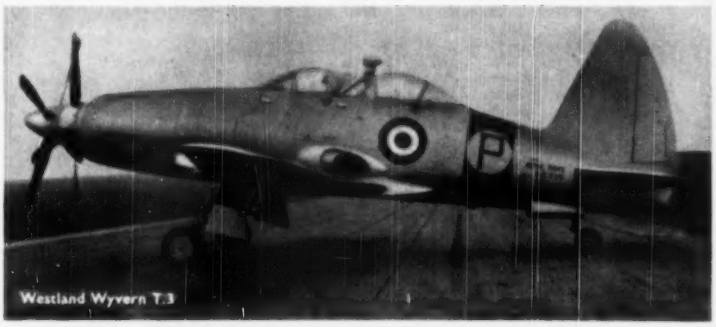
The pilot's controls consist of a column which governs forward, rearward and sideways movement; the main collective-pitch lever (located to the left of the pilot's seat) to control the pitch of the blades for ascent and descent; a twist-grip on the last-named lever, actuating the engine throttle; and rudder pedals to control the steering rotor.

The standard power plant is the Alvis Leonides of some 500 h.p. Particular requirements can be met to special order. Typical of the fittings available is a pilot-controlled hydraulically operated hoist.

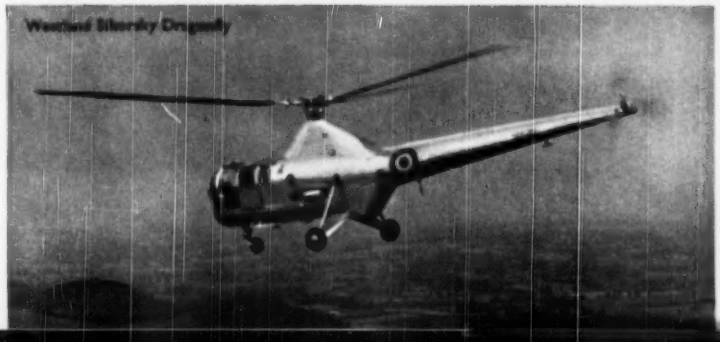
Rotor diameter, 48ft; gross weight, 5,700 lb; max. cruising speed, 85 m.p.h. at sea level.



Westland Wyvern T.F.2



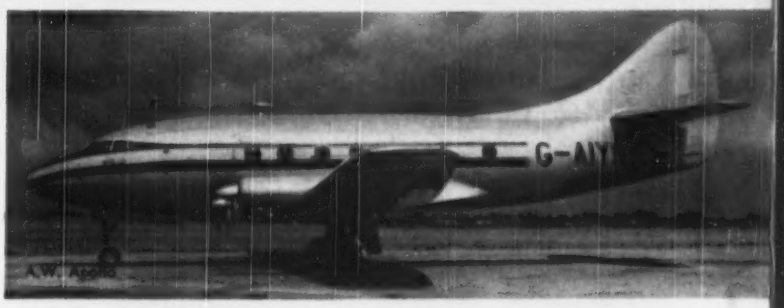
Westland Wyvern T.3



Westland Sikorsky Dragonfly

British Aircraft, 1950

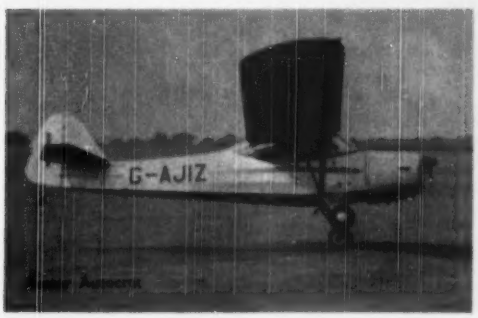
CIVIL TYPES

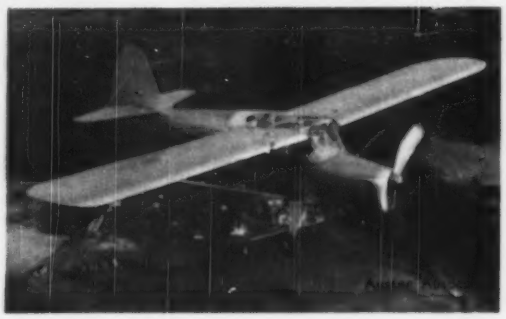


Airspeed Ambassador

THE next airliner to be introduced on B.E.A. services, and among the last to have piston engines, the Ambassador (two Centaurus) has been developed over a considerable period and has many outstanding qualities. Its single-engine performance, including take-off with one airscrew feathered, is especially remarkable. In B.E.A. production form it carries 47 or 49 passengers, a movable bulkhead permitting increased freight space in place of seats. On long-stage duties of over 1,000 miles, which would be flown at medium altitude (about 20,000ft), a 36-passenger layout, as in the prototype, might be used. At the present a.u.w. all international safety requirements are complied with from a runway length of only 1,530yd. The quietness, spaciousness and good view offered from the cabin will appeal strongly to passengers.

Span, 115ft; gross weight, 52,000 lb; max. wing loading, 43.3 lb/sq ft.





Armstrong Whitworth Apollo

AN advanced, medium-sized aircraft, the Apollo is offered as a general-purpose transport. Its four Mamba turboprops, close-cowled and remarkably slender, give it a good performance for short and medium-range duties, and normal accommodation would be for 31 passengers and some 10,000 lb of freight. Another version carries 26 seats, together with 330 cu ft cargo volume. Provision is made for humidification and refrigeration as additions to the standard preasure system. A special long-travel landing gear and twin main and nosewheels are employed. A modified fin and rudder have been fitted since the prototype's previous public appearances. The second prototype is nearing completion.

Span, 98ft; gross weight, 45,000 lb; max. wing loading, 45.6 lb/sq ft.

Auster Aircraft

REFINEMENT over several years has resulted in the production by the Auster company of a series of closely related high-wing light aircraft covering almost every requirement. All are robust, simple and economical. The smallest, the flapless two-seat Arrow, has a 75 h.p. Continental engine and is an unusually attractive lightweight.

The Autocrat, widely used by clubs and private owners for instruction, touring and joy-riding, is a roomy three-seater with Cirrus Minor engine.

A promising and versatile newcomer, the Aiglet, may be loosely described as a Gipsy Major 1-powered Autocrat with larger fin area and horn-balanced rudder. Its ex-works price (with reconditioned engine) has been kept down to £1,150. Small fields at high altitudes are well within its capabilities. Normally a three-seater, a bench rear seat may be added to make the total four. Equipped for agricultural uses—seeding and dusting—it becomes a two-seater. Very similar in appearance and in duties performed, but carrying a greater load (except fuel—$10^{3}/_{4}$ gal compared with 15 gal), is the J.5, costing £1,350.

A full four-seater offered for sale quite recently is the Autocar. Primarily a family tourer, it is, like the rest of its breed, a versatile and economical aircraft. The engine is a Gipsy Major and with 16-gal tanks in each wing the range is 500 miles.

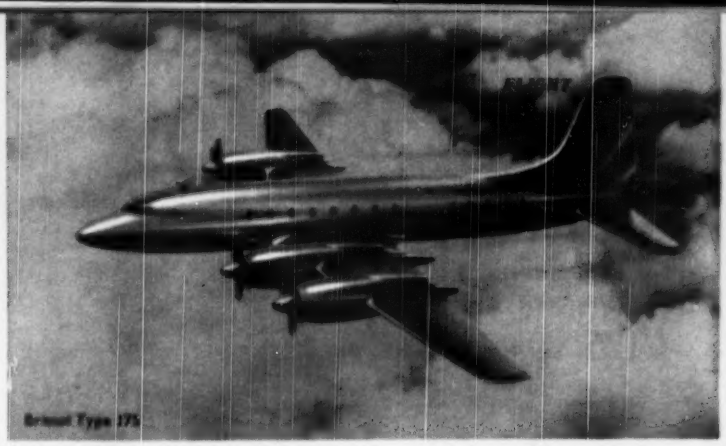
Span (all types), 36 ft; gross weights, in order of mention, 1,450 lb, 1,850 lb, 2,000 lb, 2,150 lb, 2,400 lb.

Avro Canada Jetliner

IT had been hoped that the C.102 Jetliner would fly to Farnborough for exhibition. However, the development programme and airline trials in Canada were deemed to have higher priority. This month it is to fly on T.C.A. routes, carrying freight. Modern—even ahead of its time—this four-jet (R.-R. civil Derwent 5s) airliner is intended for short and medium-range services at over 400 m.p.h.

Blackburn and General Aircraft Freighter

A MILITARY prototype of this large rear-ramp-loaded transport is flying, and reference is made to it under "Military Aircraft."



Bristol Brabazon I Mk. I and Type 167/2

THE Brabazon I Mk. I has made a deep impression upon all who have witnessed its stately progress in flight or examined its immense interior. Testing and development have been proceeding very satisfactorily. Flights at full operational height of 25,000ft and cross-wind take-offs and landings have been carried out. This development aircraft is the most fully instrumented of any type to date.

The Type 167/2, of which the first is now well advanced in construction, will show a number of refinements as compared with the Brabazon, and will have eight paired Bristol Proteus turboprops. These develop 3,350 s.h.p. at 10,000 compressor r.p.m. This huge aircraft is designed for direct Atlantic services and will have a range of 5,450 miles at 330 m.p.h. at 35,000ft, with suitable payload.

Span, 230ft; gross weight, 290,000lb; max. wing loading: Brabazon 1, 84.5lb/sq ft; Type 167/2, 83.8 lb/sq ft.

British Aircraft, 1950 — Civil Types —

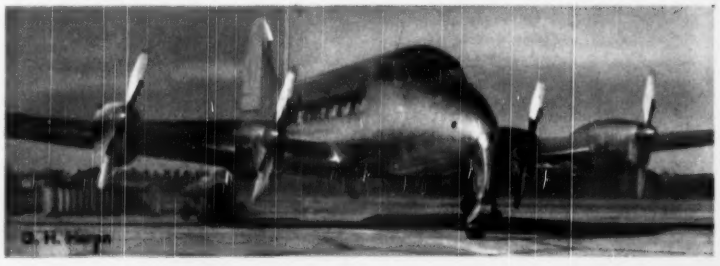
Bristol 170 Mk. 31

LATEST version of the well-known 170 series, the Mk. 31 has Hercules 739 engines and increased a.u.w. The addition of a dorsal fin will be noted. The aircraft may be used as a short or medium-range freighter carrying a load of up to 11,000lb in its spacious nose-loading hold, or as a 32-passenger transport. Various part-passenger, part-freighter arrangements are possible.

Span, 108ft; gross weight, 41,000lb; max. wing loading, 28.2 lb/sq ft.

Bristol 171 Mk. 3

WITH seating capacity of five, this helicopter (known as the Sycamore) has reached final development stages. Of conventional layout, with single 3-blade rotor, it is unusually fast, being capable, with Alvis Leonides, of 120 m.p.h. for high-speed cruising. (An earlier mark is illustrated.) A twin-engined design, also Leonides-powered, and known as the Mk. 173, is due to fly next summer.



Bristol 175

DESIGNED in close co-operation with B.O.A.C., for whose routes it is destined, the Proteus-powered Type 175 is to be a 50-seater and will cruise at 330 m.p.h. at 25-30,000ft. Alternative accommodation is for 62 passengers or for a smaller number of sleeperettes.

Span, 140ft; gross weight, 130,000lb; max. wing loading, 63.3 lb/sq ft.

Chrislea

SIMILAR in many respects to the nose-wheel Super Ace 3, the latest Chrislea product, the four-seater Skyjeep, is a tail-down type. Both aircraft have several novel features, including ingenious constructional details making for ease and economy of maintenance. Skyjeep data :

Span, 36ft; gross weight, 2,550lb; wing loading, 14.4 lb/sq ft.

Cierva Skeeter II

WEIGHING only 1,800lb this little two-seater helicopter is suitable for private, military or training use. Maximum endurance (18 gal.) is 3.5hr.

de Havilland Comet

FIRST and most promising pure-jet airliner, the Comet (see page 286) is in production for B.O.A.C. and other routes. Two prototypes are flying and the first production machine should fly this year. The first Comet has averaged almost one hour of flying per day for its first year. A cost price of £450,000 is quoted. In its present form the Comet is best suited to operate stage lengths between 1,000 and 2,000 miles. It cruises at 500 m.p.h. at 40,000ft with 28-36 passengers.

Span, 115ft; gross weight (preliminary), 106,000lb.

D.H. Dove

THIS widely used 8-11-seater feeder-liner continues to give good service at home and abroad. Recently, Gipsy Queen 70/4 engines (375 h.p.) have been fitted. They meet American single-engine requirements, having no time limit in maximum continuous cruising conditions. Several marks of Dove are offered; they include Mks. 1-3 for passenger transport, executive travel, survey, ambulance, and agricultural duties respectively.

Span, 57ft; gross weight, 8,500lb; max. wing loading, 25.36 lb/sq ft.

D.H. Heron

DESCRIBED with justification as a "blown-up" four-engined Dove, the Heron does, in fact, use a number of major Dove units—outer wings, fuselage, nose and tail. The cabin accommodates 14-17 passengers, and the engines are unsupercharged Gipsy Queen 30s with c.s. airscrews. Fixed-wheel and retractable-wheel versions are offered. Operation from small airfields is in mind and economy has been a keynote. Maximum practical stage lengths (fixed gear) is about 850 miles at 160 m.p.h.

Span, 71ft 6in; Gross weight, 12,500lb; max. wing loading, 25.64 lb/sq ft.

D.H. (Canada) Beaver

A RUGGED general-purpose load carrier, equally at home on wheels, skis or floats, the all-metal high-wing Beaver, designed and built in Canada, has an exceptionally good take-off and climb, and is thus able to operate from small clearings or lakes in its native country. The engine is a 450 h.p. Pratt and Whitney. Pilot and six others can be carried, but seats are quickly detachable and a large door permits bulky loads to be taken in place of passengers. Cruising speed is 130-150 m.p.h. and maximum range 850 miles.

Span, 48ft; gross weight (seaplane), 4,820lb; max. wing loading, 19.3 lb/sq ft.

D.H. Drover

THIS Australian light transport has three Gipsy Major 10 engines, carries 6/7 passengers and cruises at 135 m.p.h.

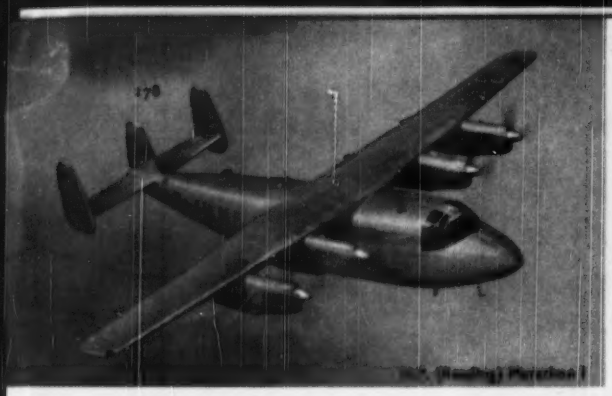
Fairey Junior

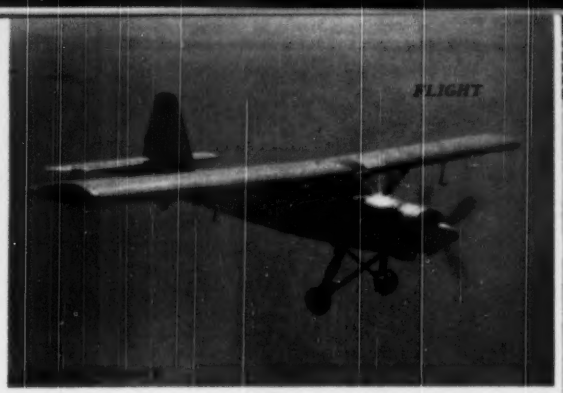
AN official Boscombe Down report on this 55 h.p. ultra-light single-seater concludes, "All who flew the aircraft were unanimous in saying that it was very easy and a pleasure to fly. It had no vices and was considered to be ideal for student pilots flying to gain experience for the Private Pilot's Licence." Tests were made at the maximum a.u.w. of 770lb. Spins of up to eight turns were made in both directions and recovery was immediate. Stalling speeds, power on and off, were respectively 32 m.p.h. and 26 m.p.h.

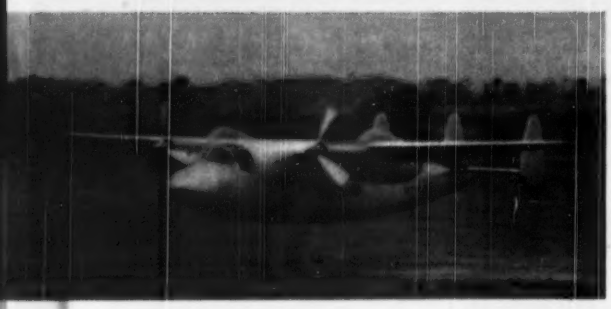
Handley Page Hermes IV

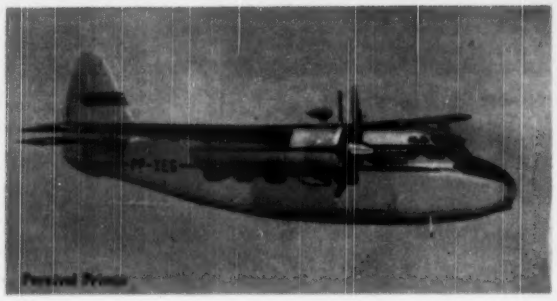
ALTHOUGH a maximum of 74 passengers is possible, the version of the Hermes IV operated by B.O.A.C. accommodates 40 in exceptional comfort. The Hermes 4s notable for its spacious cabin, the volume totalling over 2,000 c. ft; freight and baggage compartments have a volume of 402 c. ft. The engines are four Bristol Hercules 763s, in special low-drag power plants; they deliver a total of 8,400 h.p. for take-off. With its maximum cruising speed of 285 m.p.h. at 25,000ft (at which height a range of 2,000 miles is attainable with a payload of 12,675lb), the Hermes IV is among the fastest airliners of its class.

Span, 113ft; gross weight, 84,000lb; max. wing loading, 59.7lb/sq ft.









British Aircraft, 1950—Civil Types—

H.P. (Reading) Marathon II

HIGHER cruising speed (290 m.p.h.), quicker take-off and climb, and quieter, smoother flight are among the benefits conferred on the Marathon II—the world's only turboprop feederliner—by the installation of two 1,128 h.p. A.S. Mambas in place of the piston engines.

H.P. (Reading) Marathon I

BRITISH EUROPEAN AIRWAYS have ordered 16 of these 22-passenger medium-range airliners and keen overseas interest was aroused by the recent 40,000-mile world demonstration tour of the first production aircraft. During the tour over 300 take-offs and landings were made successfully under extremely varying conditions. Four 345 h.p. D.H. Gipsy Queen 70 engines give the Marathon I a performance which exceeds I.C.A.O. requirements and includes a 500-mile range at cruising speeds between 160 and 210 m.p.h.

Span, 65ft; gross weight, 18,000lb; max. wing loading, 36lb/sq ft.

Handley Page Hermes V

THE Hermes V is powered by four 2,820-h.p. Bristol Theseus turboprops, which give it the high cruising speed of 330 m.p.h. Although otherwise basically similar to the piston-engined Mk. IV, production-type Hermes Vs would have an 8,000-lb increase in all-up weight.

Percival Prince

APART from minor improvements to meet operational needs, the major part of the Prince development programme has now been completed. In its first year of service the aircraft has proved itself to be a versatile and capable "medium twin"—readily adaptable for a variety of uses. Basically a feederliner or executive transport, it is also available for freight-carrying, survey, pest control, ambulance and crew-training duties.

Production of the P.50 Series I and II machines (standard civil versions) has now been completed and the Series III aircraft fitted with the more powerful Alvis Leonides 502/4 engines, are currently on the assembly line. These have an increased a.u.w., which permits a disposable load of 2,642lb with full normal tanks (i.e. for a still air range of 902 miles).

Span 56ft; gross weight, 11,000lb; max. wing loading 30.1lb/sq ft.

Prestwick Pioneer

ORIGINALLY conceived for military purposes, the Prestwick Pioneer Mk. I (Gipsy Queen 32 engine), built by Scottish Aviation, was considered to be somewhat underpowered. Accordingly, the Mk. II version—which has already undergone initial flight trials at Boscombe Down, is fitted with an Alvis Leonides engine. It is claimed that with a maximum a.u.w. of 5,400lb the aircraft has a cruising speed of 151 m.p.h. at 9,750ft. The take-off on grass is only 80 yd and landing run is 66yd.

Saunders-Roe Duchess

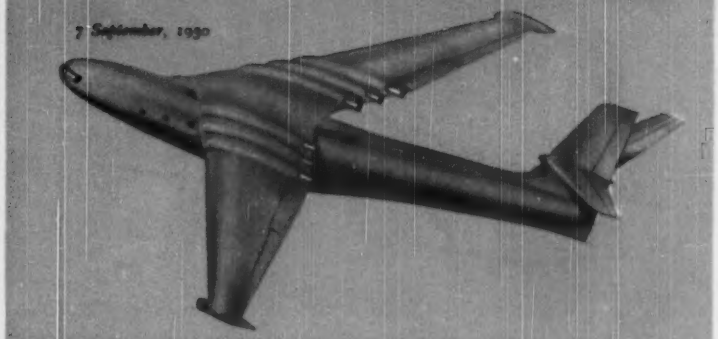
TO flying-boat protagonists the announcement last May of the Saunders-Roe Duchess project—for a medium-range jet-propelled flying-boat of very advanced design—was undoubtedly the most encouraging news of recent years. Powered by six D.H. Ghost (each of 5,000lb static thrust), and with a gross weight of about 130,000lb, the aircraft is intended to carry payloads of the order of 21,000lb on medium stage-lengths (1,300-2,000 miles) at cruising speeds of up to 500 m.p.h. It is claimed that direct operating cost (1d a mile for 1,300-mile stages) will be lower than that of any other medium-range airliner in the world. The aircraft would have a particular application on routes such as the Australia-New Zealand crossing.

Saunders-Roe Princess

CONSTRUCTION of Britain's largest aircraft—the three 105-passenger, Saunders-Roe Princess flying-boats—is proceeding according to schedule. At the time (now set at mid-1951) for the eagerly-awaited first flight draws near, preparations are going ahead at the Cowes erection shop to strengthen the slipway on to which the first 140-ton prototype will be moved some time later this year to have its outer wings and rudder tip fitted. A Sunderland is being used for the pre-testing of the Princess's power-operated controls, and a full-scale replica section has been sent to Bristol for preliminary engine-running tests of the Proteus turboprops, ten of which (eight paired, two single) are specified. The Princess should cruise at 385 m.p.h.

The Princess is claimed by its makers to be capable of maintaining a non-stop service between London and New York (stage length 3,450 miles) despite the possibility of continuous headwinds averaging up to 90 m.p.h. over the whole stage.

Span, 219ft 6in; gross weight, 315,000lb.



Saunders-Roe Duchess

Saunders-Roe Princess

Short Sealand

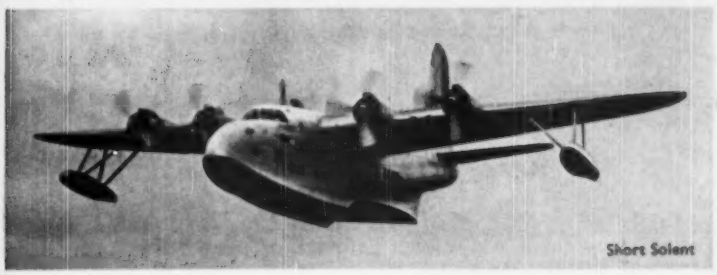
TO cater for the diverse needs of private owner, airline, or charter operator, the twin-engined Short Sealand amphibian is ideally suited. Since being granted a full C. of A. the Sealand has evoked widespread interest in many parts of the world.

At a normal gross weight of 9,100lb it has a cruising speed of 170 m.p.h. at 7,250ft. A maximum wing loading of only 25.8lb/sq ft aids in conferring good take-off characteristics—distance to 50ft from water being 1,040yd, and from land, 720yd.

Short Solent 4

THIS latest version of a popular and reliable flying-boat design is in service with Tasman Airways and has a notably good performance. Carrying 45 passengers (in unusual comfort) with their baggage and 7,278lb of mail freight, it will fly 1,330 miles at 230 m.p.h. Four Bristol Hercules 733 engines are fitted, and the maximum cruising speed is 253 m.p.h. Take-off to 50ft is achieved in 1,700yd and the climb to 10,000ft takes 12 min.

Span, 112ft 10in; gross weight, 46,980lb; max. wing loading, 46.75lb/sq ft.

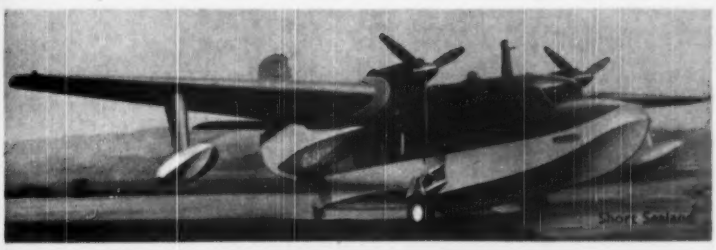


Short Solent

Vickers-Armstrong's Viscount

DURING its European demonstration tour, its tropical trials at Khartoum, and—most recently—a period of actual airline service on B.E.A.'s London-Paris run, the prototype Viscount performed so well that no misgivings may be felt concerning the merits of turboprop travel, exemplified here by the Vickers-Rolls-Royce combination. The Viscount production version (see drawing on pages 282-283) has more powerful Darts, and its overall dimensions are slightly greater. Internal arrangements differ according to customer's requirements; B.E.A.'s Viscount 701, for example, will carry 40 passengers in the well-fitted, fully pressurized cabin. An alternative version has 53 seats. Cruising at 25,000 ft at 316 m.p.h. the range is 950 miles (plus 230-mile diversion and 45 min stand-off). Cabin quiet and lack of vibration are qualities which require no further comment.

Span, 94ft; gross weight, 50,000lb.



Short Sealand

Vickers-Armstrong V.C.3

FROM the well-tried Viking, the Vickers V.C.3 design has been evolved for use on secondary routes. Carrying 27 passengers, the range is over 1,500 miles. Like the military Varsity crew-trainer, the V.C.3 has a nosewheel undercarriage.

Span, 95ft 6in; gross weight, 37,000lb.

Vickers-Armstrong Viscount

Westland-Sikorsky S-51

SEVERAL civil applications have been found for this Leonides-powered helicopter, in addition to its successful military adoption as the Dragonfly. Notable instances are the crop-spraying work of Pest Control Ltd., and B.E.A.'s pioneer passenger service between Cardiff and Liverpool.

British Aircraft, 1950

Gliders and Sailplanes

Slingsby Tutor

ALTHOUGH the past year has seen no outstanding developments in British glider design and construction, production of several well-known designs has continued steadily in response to home and overseas orders. No new military or civil transport gliders have appeared. On this page are reproduced photographs of the main types of British gliders and sailplanes; there follow brief details of these types, which are produced by two manufacturers.

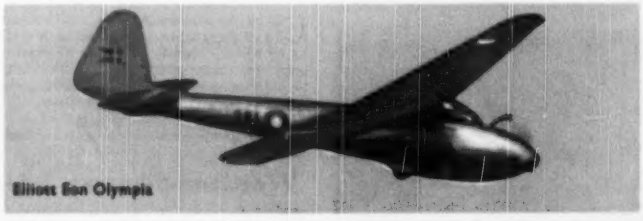
Slingsby Sailplanes, Ltd.

The most widely used of this company's products is the Cadet, a robust, single-seat glider, designed for training up to the "C" Certificate stage. The A.T.C. Gliding Schools operate several hundred Cadets. Developed from the Cadet, but suitable for aero-tow or cross-country flying, the Tutor has a wing of higher aspect ratio but is otherwise basically similar. This aircraft has, in turn, been developed into the useful Motor-Tutor ultra-light, which is fitted with a 25 h.p. Coventry Victor engine and a simple undercarriage. The handsome Gull IV is a popular high-performance sailplane which has graced many important soaring contests.

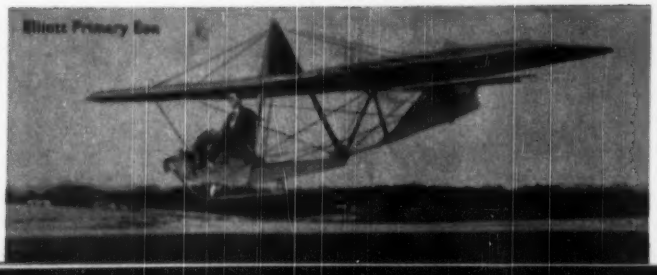
Several A.T.C. schools have taken delivery of the new Slingsby Sedbergh, which has been in service at home and overseas—in civil guise—as the 21B. This medium-performance, inexpensive trainer has side-by-side seating for instructor and pupil. Mention of the Prefect completes the brief survey of Slingsby machines; this type is semi-aerobatic and is well equipped with instruments for cloud or cross-country flying.

Elliotts of Newbury, Ltd.

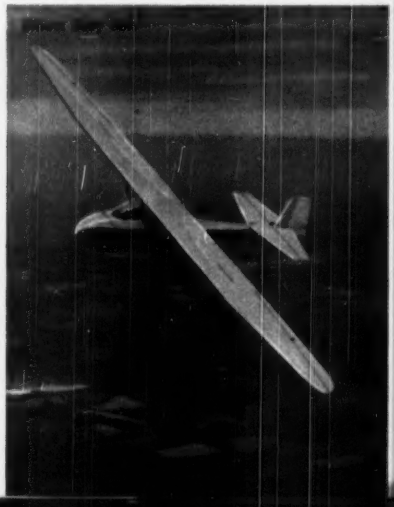
The three basic Eon designs cover a wide range of gliding activity. The simple Primary Eon is for *ab initio* training, and the more shapely Baby Eon is employed for intermediate instruction. Construction of the Baby Eon (of wood, plywood and fabric) is orthodox; for the pilot there is a neat one-piece plastic hood. The Eon Olympia, one of the best-known of high-performance sailplanes, has taken its place in recent lists of British aircraft exports; the example shown here was recently delivered by aero-tow to the Royal Danish Air Force.

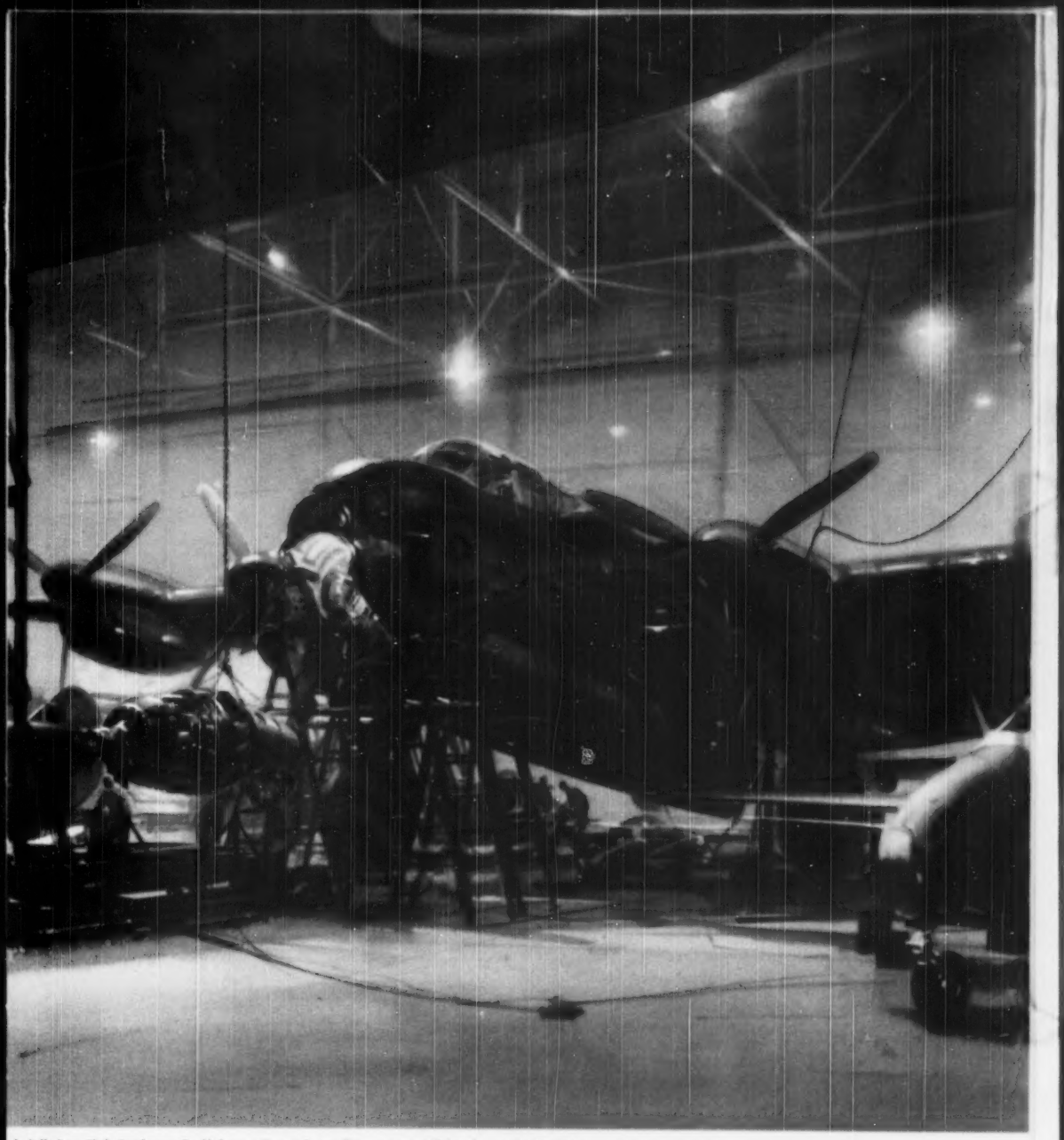


Elliott Eon Olympia



Elliott Primary Eon





the Rolls-Royce Flight Development Establishment a Dart turbo-propeller engine is installed in the nose of a Lancaster.

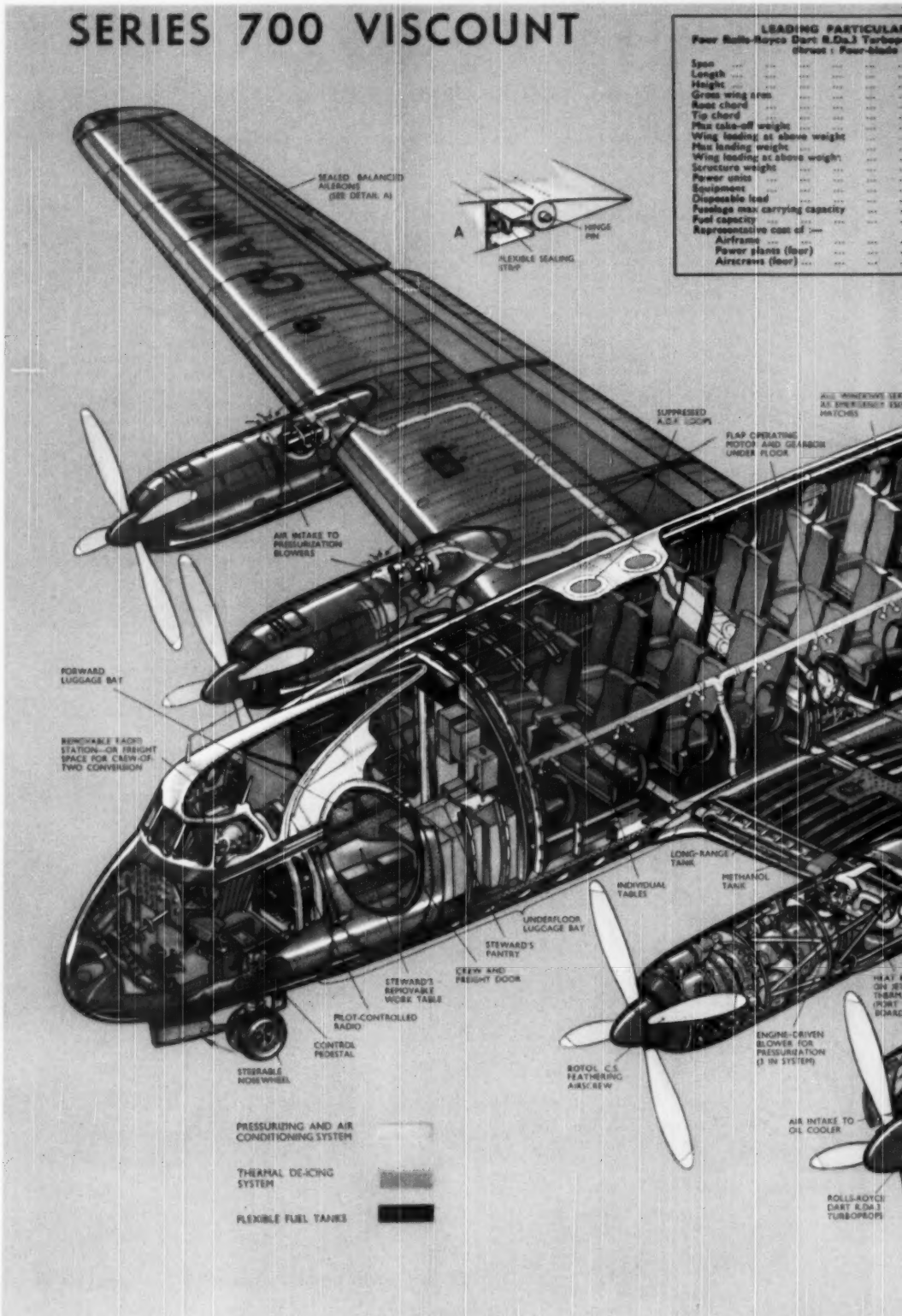
ESSO SERVES AVIATION

Esso are suppliers of Aviation Fuels and Lubricants to all the major British Aircraft and Engine builders.

AVIATION Esso SERVICE

ANGLO-AMERICAN OIL COMPANY LIMITED, 36 QUEEN ANNE'S GATE, LONDON, S.W.1

SERIES 700 VISCOUNT



LEADING PARTICULARS

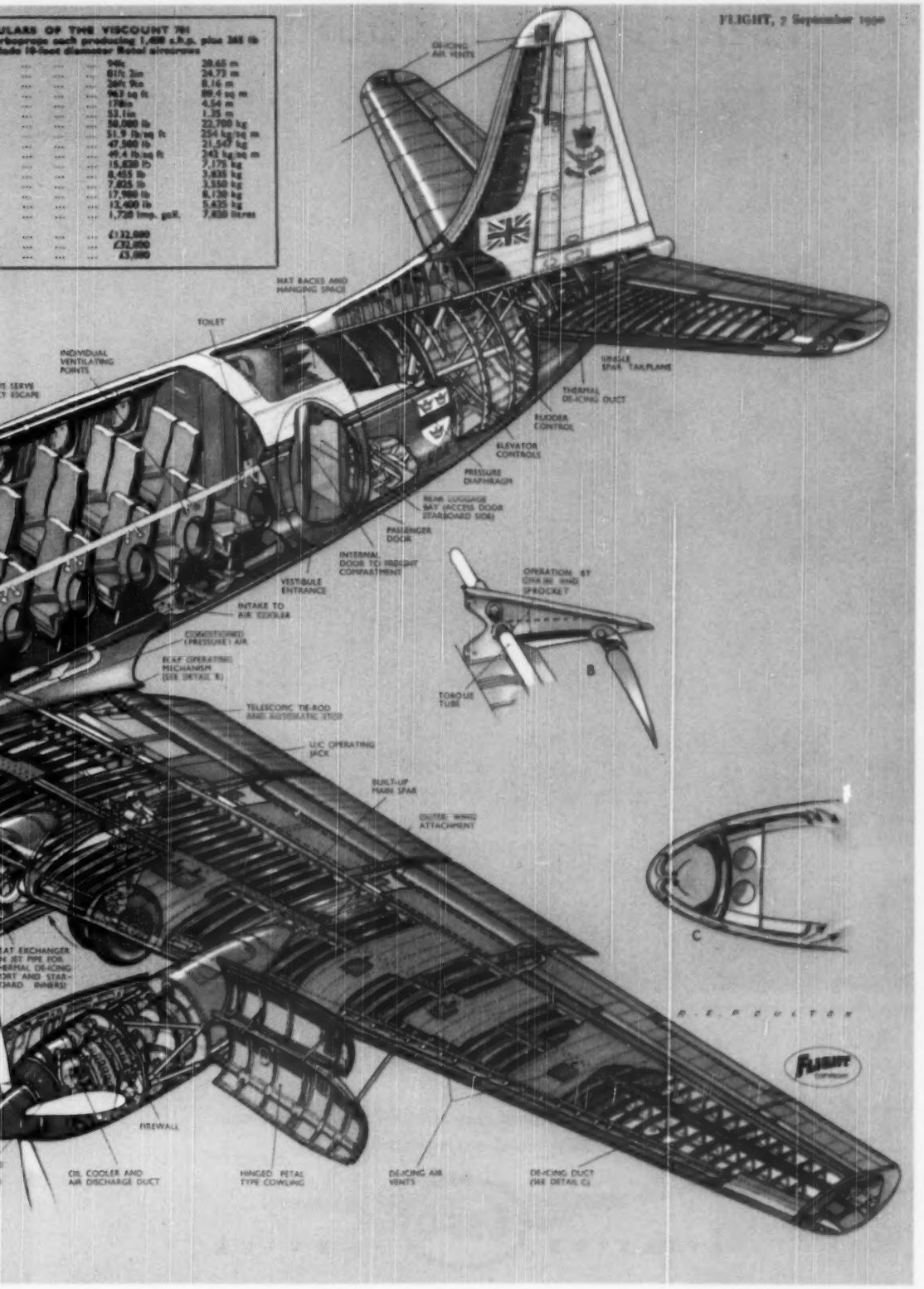
Four Rolls-Royce Dart R.Da.3 Turboprop engines : Four-blade

Span	
Length	
Height	
Gross wing area	
Root chord	
Tip chord	
Max take-off weight	
Wing loading at above weight	
Max landing weight	
Wing loading at above weight	
Structure weight	
Power units	
Equipment	
Disposable load	
Fuselage max carrying capacity	
Fuel capacity	
Representative cost of —	
Airframe	
Power plants (four)	
Aircrews (four)	

ULARS OF THE VISCOUNT 701

rboprops each producing 1,450 e.h.p. plus 385 lb
ade 10-foot diameter Rotol aircrews

...	...	...	94ft.	28.65 m
...	...	...	81ft. 3in	24.73 m
...	...	...	26ft. 9in	8.16 m
...	...	...	963 sq ft.	89.4 sq m
...	...	...	178in	4.54 m
...	...	...	53.1in	1.35 m
...	...	...	50,000 lb	22,700 kg
...	...	...	51.9 lb/sq ft	254 kg/sq m
...	...	...	47,500 lb	21,547 kg
...	...	...	49.4 lb/sq ft	242 kg/sq m
...	...	...	15,620 lb	7,175 kg
...	...	...	8,455 lb	3,835 kg
...	...	...	7,825 lb	3,550 kg
...	...	...	17,980 lb	8,130 kg
...	...	...	12,400 lb	5,625 kg
...	...	...	1,720 Imp. gal.	7,820 litres
...	...	...	£132,000	
...	...	...	£32,050	
...	...	...	£5,000	



SERIES 700 VISCOUNT

COMFORT FOR THE PASSENGER AND CONVENIENCE FOR THE OPERATOR

FEW new aircraft when they emerge from the factory find themselves in the enviable position of the first Viscount 700, which was born, as it were, with some six hundred hours' flying experience at home and overseas on a similar, though shorter, prototype as its background. There are to be three production types of Viscount in the 700 Series: the 701, a 40-seater with crew of three; the 702A with the same passenger accommodation but a crew of only two and additional freight space; and the 703, a 53-seater version with three crew for high-density traffic.

Both B.O.A.C. and B.E.A. have indicated their intentions to operate Viscounts, and overleaf is a special colour cut-away drawing of the proposed B.E.A. Type 701. Viscount economics have also figured in the Corporations' recent reports and plans, while probable orders mentioned total about 40, of which 20 to 25 would be for B.E.A. and some 15 for B.O.A.C. (for B.W.I.A.).

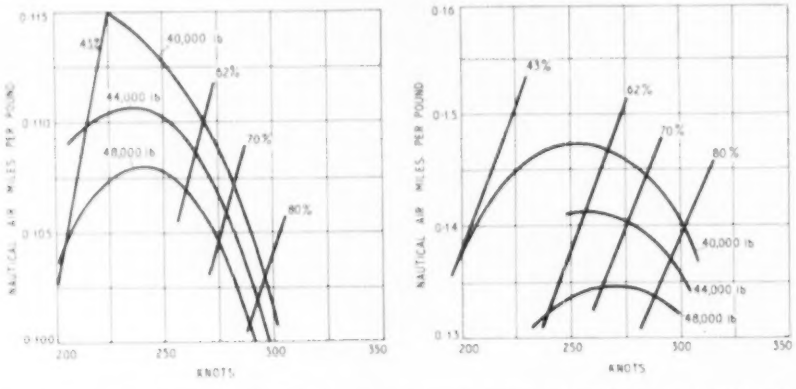
Among the Viscount's many talking points, passenger comfort is predominant. The airliner's extreme smoothness and quietness—in which it unquestionably surpasses all other aircraft now flying—together with its spaciousness, the modest luxury of the seating, and unusual, large elliptical windows (26in × 19in), are certain to impress passengers. Sufficient speed to reduce by one-third existing journey-times while flying at smooth, over-weather altitude not only means greater convenience but may indirectly lead to cheaper fares as a result of getting more work done in a given period.

Air-conditioning and pressurization systems maintain a constant pre-set cabin air temperature between outside atmosphere limits of — 70 deg. F and + 90 deg F, and at the normal operating height of 25,000ft, conditions equivalent to 5,000ft (6.5 lb/sq in) for 44 persons in the cabins. The latter figures represent a complete air-change every 2½ min, or 50 cu ft/min for each person.

Qualities of particular interest to the operator include low maintenance time and costs and the unusual accessibility of the turboprop power units. In operation, an overhaul period of 800 hr for airframe, power plants and airscrews is anticipated for a start, and calculations of economics have been made on this assumption. Absence of vibration is responsible to a considerable extent for high instrument and component serviceability.

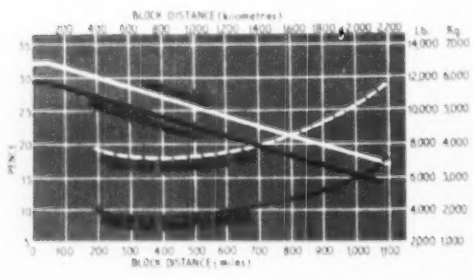
Special attention has been paid to what is called indiscriminate loading, and provided that the freight load is distributed between the three forward and single aft holds in the prescribed manner, the passengers may be seated in any positions in the saloon. Up to 5,750 lb of freight can be accommodated in the holds.

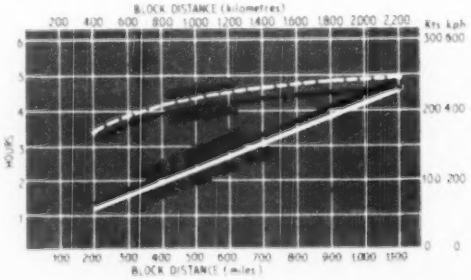
The Rolls-Royce Darts are quickly removable, self-contained units with close, petal-type cowlings of improved design. Some performance and cost curves for the aircraft appear below, and principal data for the Viscount 701 are tabulated on the next page.



The above curves of cruise performance for various percentage powers and weights are for 15,000ft (left) and 25,000ft (right) altitudes.

The curves below have been compounded to show the optima in Viscount performance in terms of payload, cost, time and speed.





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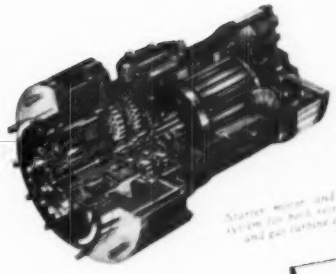
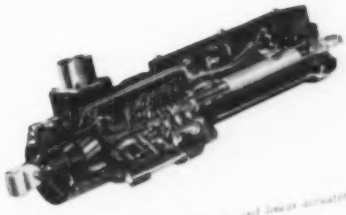


Starter motor and starting system for both reciprocating and gas turbine engines.



Rotary and linear actuators.

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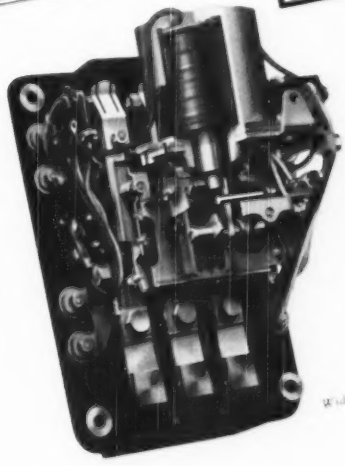
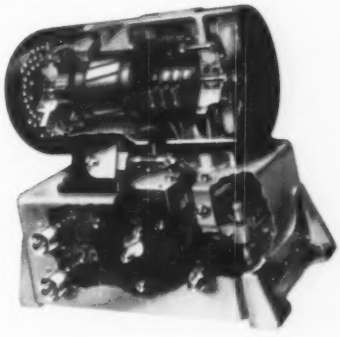
Stand No. 124



Wide range of starters for all aircraft purposes.



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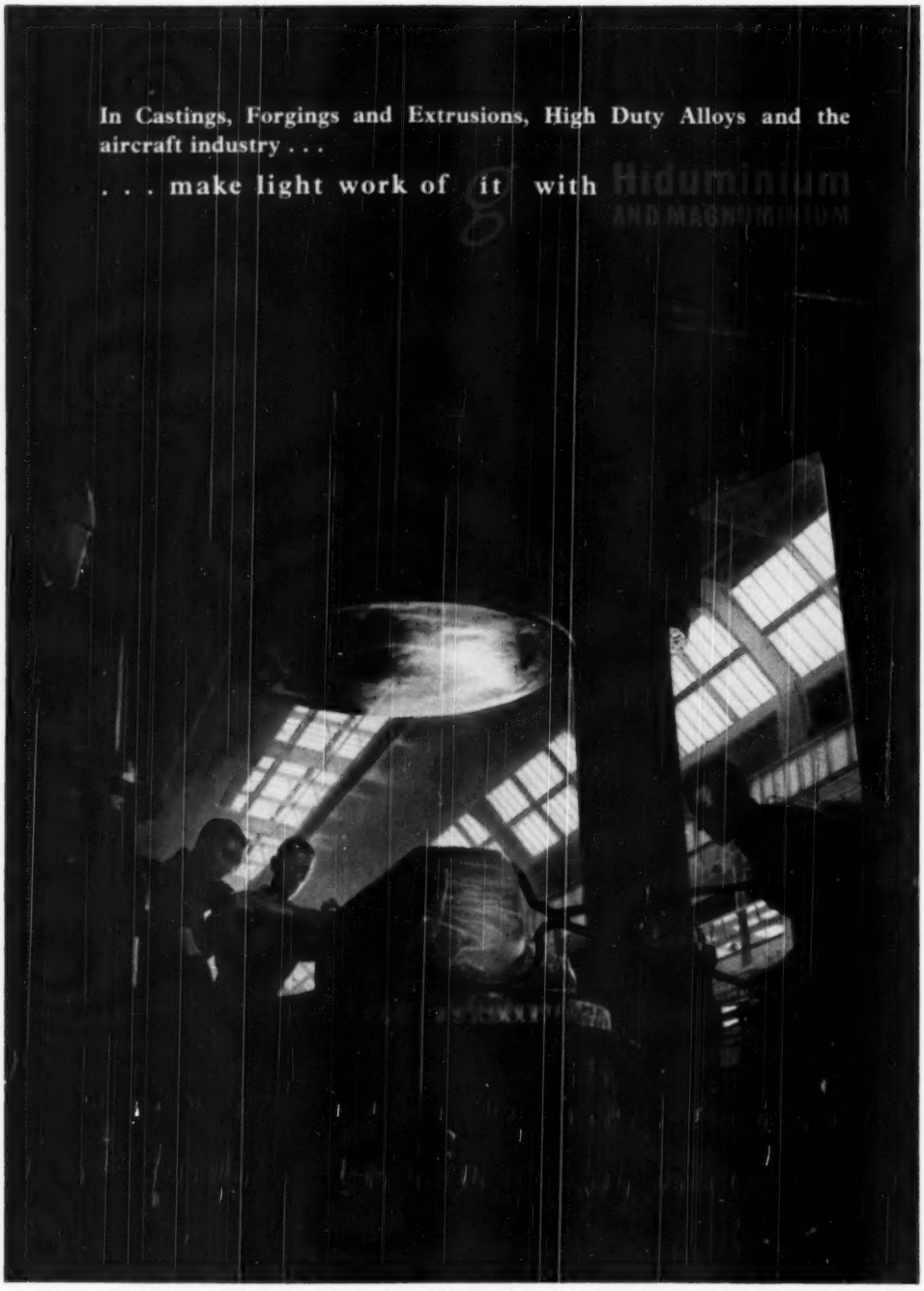
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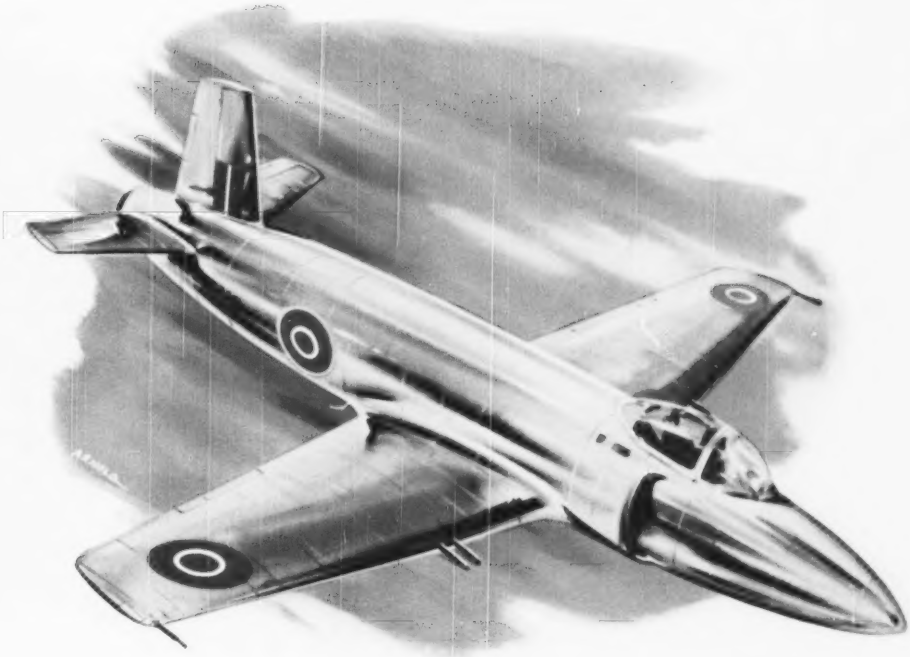

Material Advantages

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ROTOL

PROPELLERS

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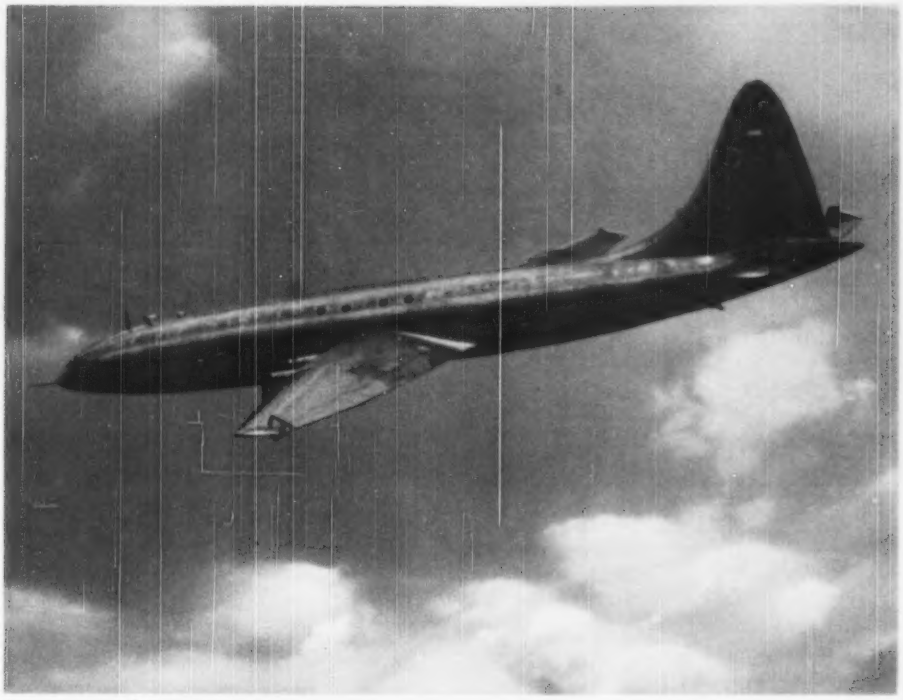

BRITAIN'S MOST TALKED-OF AIRCRAFT

DISSIMILAR in many respects, the Bristol Brabazon and de Havilland Comet share the distinction of being the most widely discussed airliners to be produced by any nation since the war. There are solid technical reasons for such fame and—as these pictures show—both aircraft give an immediate impression of beauty and efficiency.

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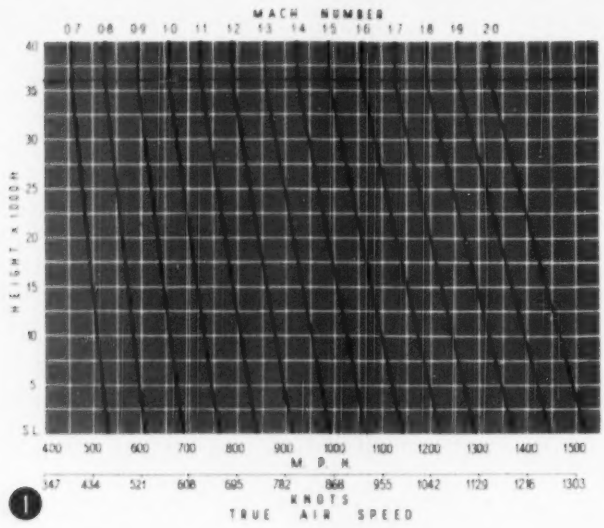
ATMOSPHERIC FACTORS



1

2

ALTHOUGH the effect which the atmosphere has upon aircraft performance is well known, we believe that the graphic presentation of certain of the fundamental and derived data is of value not only as a means of emphasizing points which are apt to be taken for granted but also as a means of providing ready references.

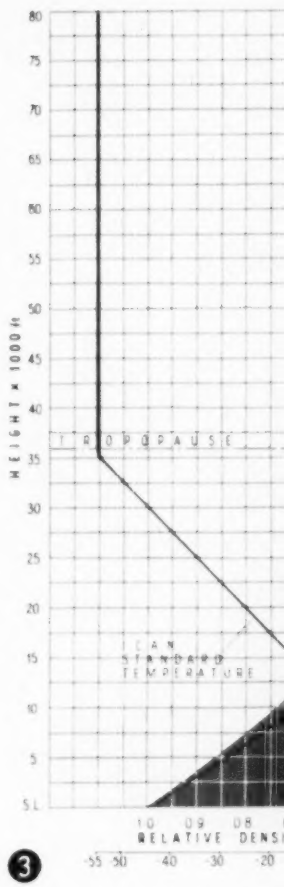
Graph No. 1 gives the true speed equivalents for a variety of Mach number values from sea-level up to the tropopause. Above this height the temperature remains constant and as Mach number is variable directly as a function of temperature, above the tropopause a given Mach number is equivalent to a fixed speed. A Mach number of 1.0 is, of course, the speed of sound in air.

Graph No. 2 shows comparative values of Indicated Air Speed and True Air Speed for a variety of altitude levels, and the T.A.S. may be read off from the I.A.S.—or vice versa—simply by finding the intersection point of the relevant speed with the altitude line concerned. The Mach number lines have been included to permit the direct association of Indicated Air Speed with Mach number.

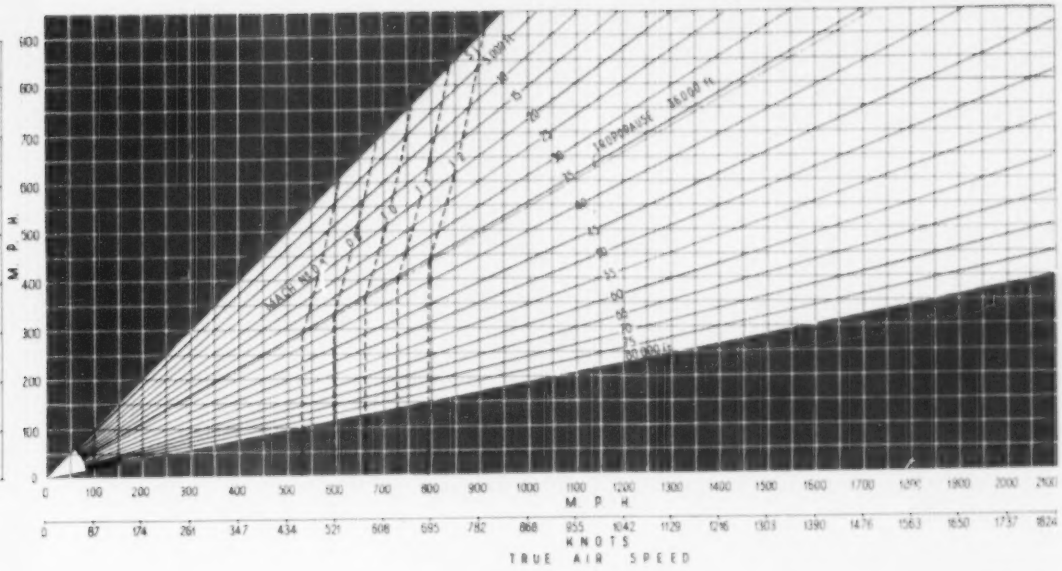
Graph No. 3 shows the progressive drop in temperature from sea-level up to the tropopause, and the reduction of relative density (ρ/ρ_0) and relative pressure (p/p_0) from sea-level up to 80,000ft. In the I.C.A.N. standard atmosphere, freezing level is reached at 7,500ft, and at 36,000ft the temperature stabilizes at 55 deg C below zero—i.e., 99 deg of frost as measured by the familiar domestic Fahrenheit scale. It is worth noting that, at 25,000ft, the atmospheric density has dropped to less than half its value at sea-level, whilst pressure has dropped to less than 40 per cent of its surface value. At 40,000ft, the reduction in density and pressure is such that, even with 100 per cent oxygen, human life can no longer be sustained. Even if it could, however, the water content in the body would vaporize and begin to boil at 55,000ft, whilst at 60,000ft the blood would boil: the importance of cabin pressurization for flight at high altitudes is, therefore, readily apparent.

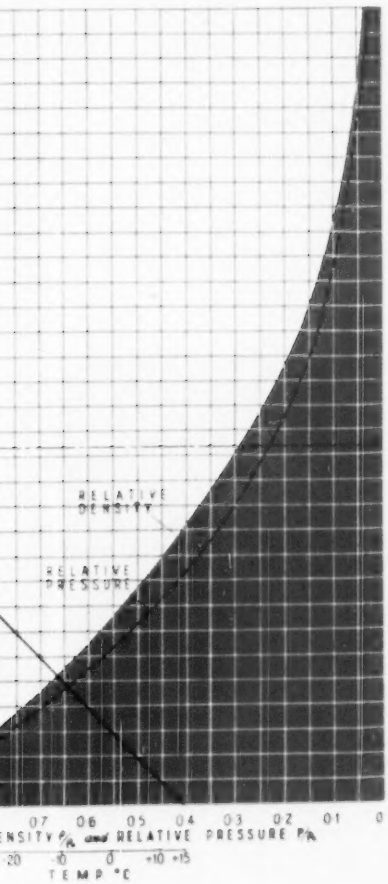
Graph No. 4 has been designed to illustrate the constriction of speed range with altitude for a typical modern fighter aircraft. The normal (high-incidence) stalling speed (without flaps) has been taken as 110 m.p.h. and the critical Mach number as 0.8. For these purposes the M_{CRIT} is assumed to be the compressibility shock-stall threshold; it is, therefore, the limiting Mach number at which the aircraft remains controllable. Thus it can be seen that the normal stalling speed mounts steadily—in terms of true air speed—until at 76,500ft it intersects the 0.8 M line; at this height the aircraft could no longer fly, since if it travelled any slower it would stall, and if it travelled any faster it would become uncontrollable.

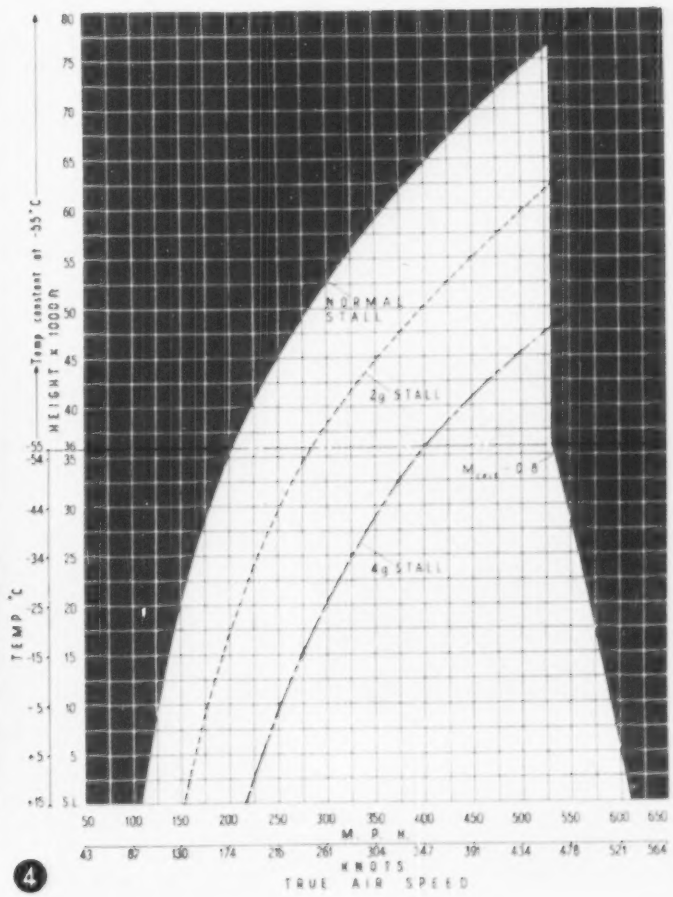
The broken lines represent the stalling speeds when the wing loading is doubled and quadrupled. This is of great importance in fighter aircraft, where the pilot may well be forced in combat to impose loads on his aircraft in excess of that produced by an acceleration of 4 g. Accepting the 4 g stall limit as a reasonable boundary, however, it is clear that the typical aircraft we have selected—which is representative of some of the best fighters now current—has what may be described as an effective fighting ceiling of little more than 45,000ft. This can only be lifted by increasing the critical Mach number and/or by reducing the normal unflapped stalling speed. The former is purely a matter of aerodynamic refinement, but the latter can be achieved either by reducing the wing loading, or by increasing the lift coefficient. Of these alternatives, the easiest is to reduce wing loading (though this is by no means easy) and it does appear almost inevitable that the trend in future fighter types will be toward the use of moderate wing-loadings.


80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 S.L.
HEIGHT × 1000 ft
TROPOPAUSE
I.C.A.N. STANDARD TEMPERATURE
1·0 0·9 0·8
RELATIVE DENSI
-55 -50 -40 -30 -20

3


M P H
MACH NO
M P H
KNOTS
TRUE AIR SPEED


RELATIVE DENSITY
RELATIVE PRESSURE
TEMP °C


Temp constant at -55°C
HEIGHT x 1000 ft
TEMP °C
NORMAL STALL
2g STALL
4g STALL
M P H
KNOTS
TRUE AIR SPEED

4

BRITISH EUROPEAN AIRWAYS
ROTOL
PROPELLERS
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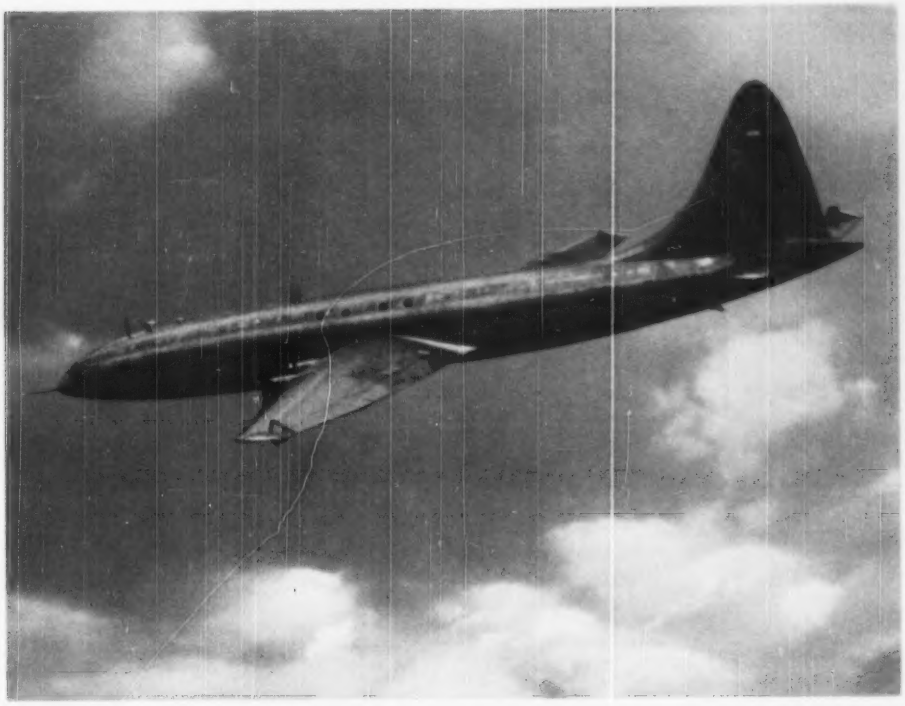

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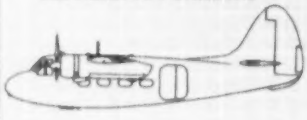
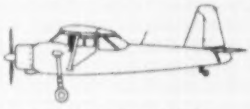
THE BRISTOL TYPE 171

THE FAIREY FB-1 GYRODYNE

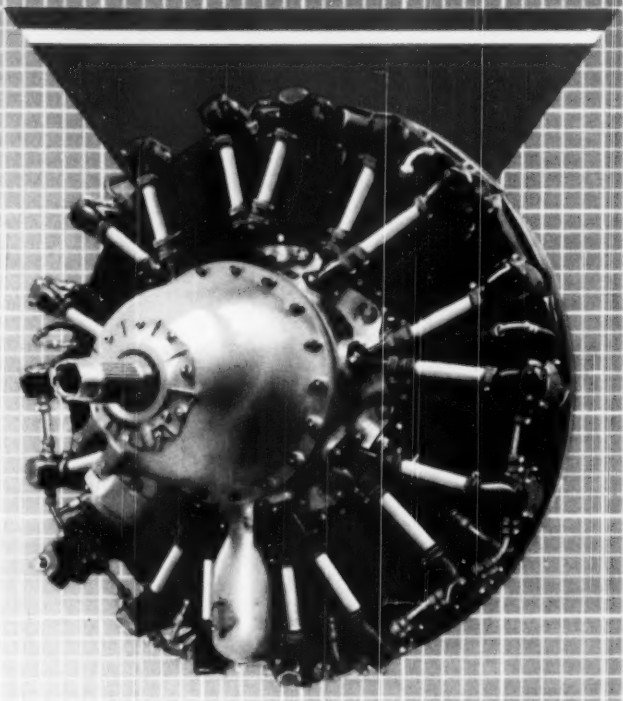


THE PERCIVAL PRINCE



THE PRESTWICK PIONEER

THE WESTLAND SIKORSKY S.51



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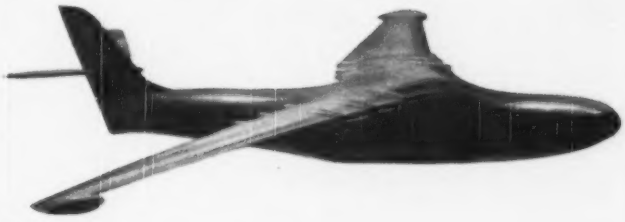

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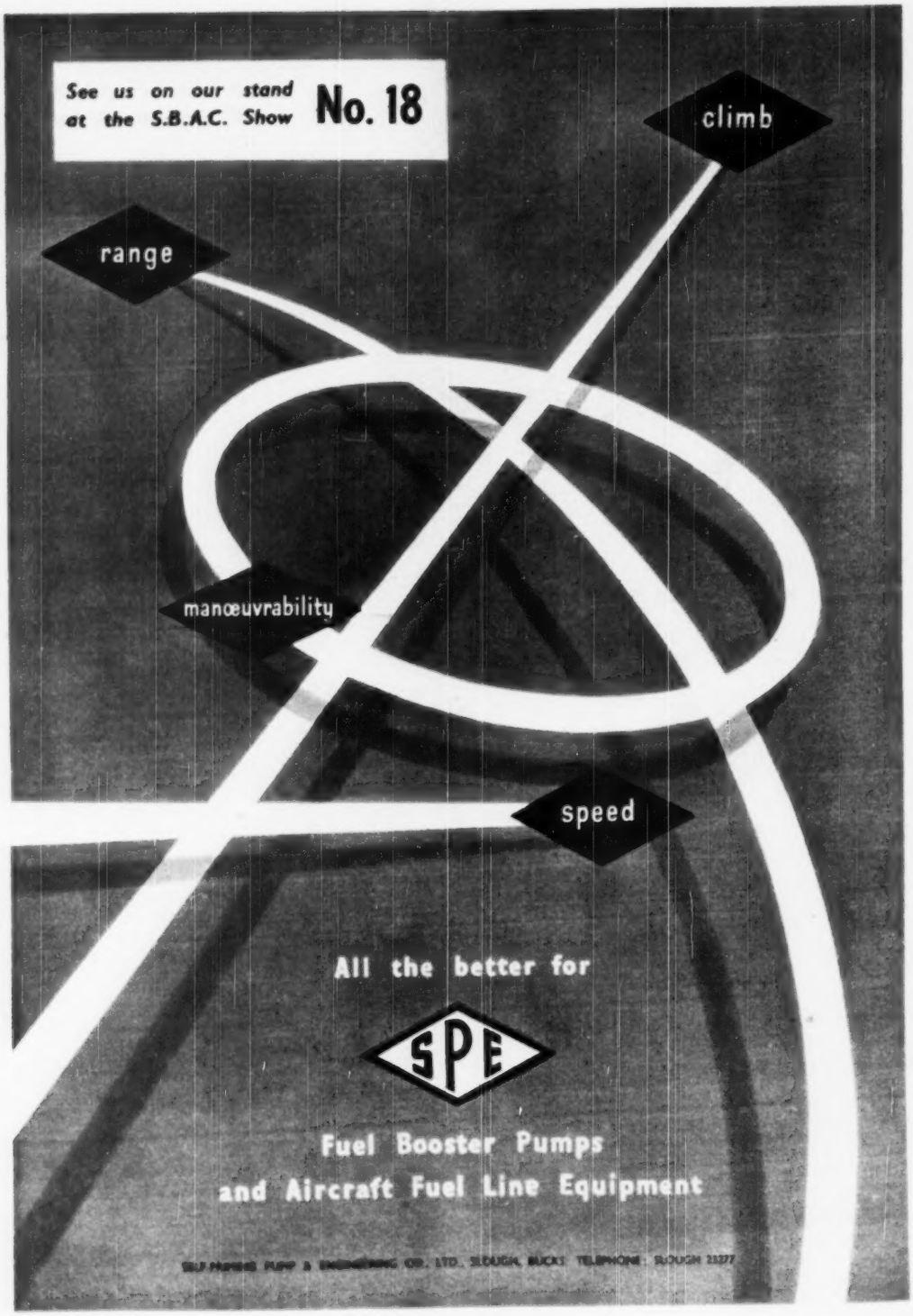
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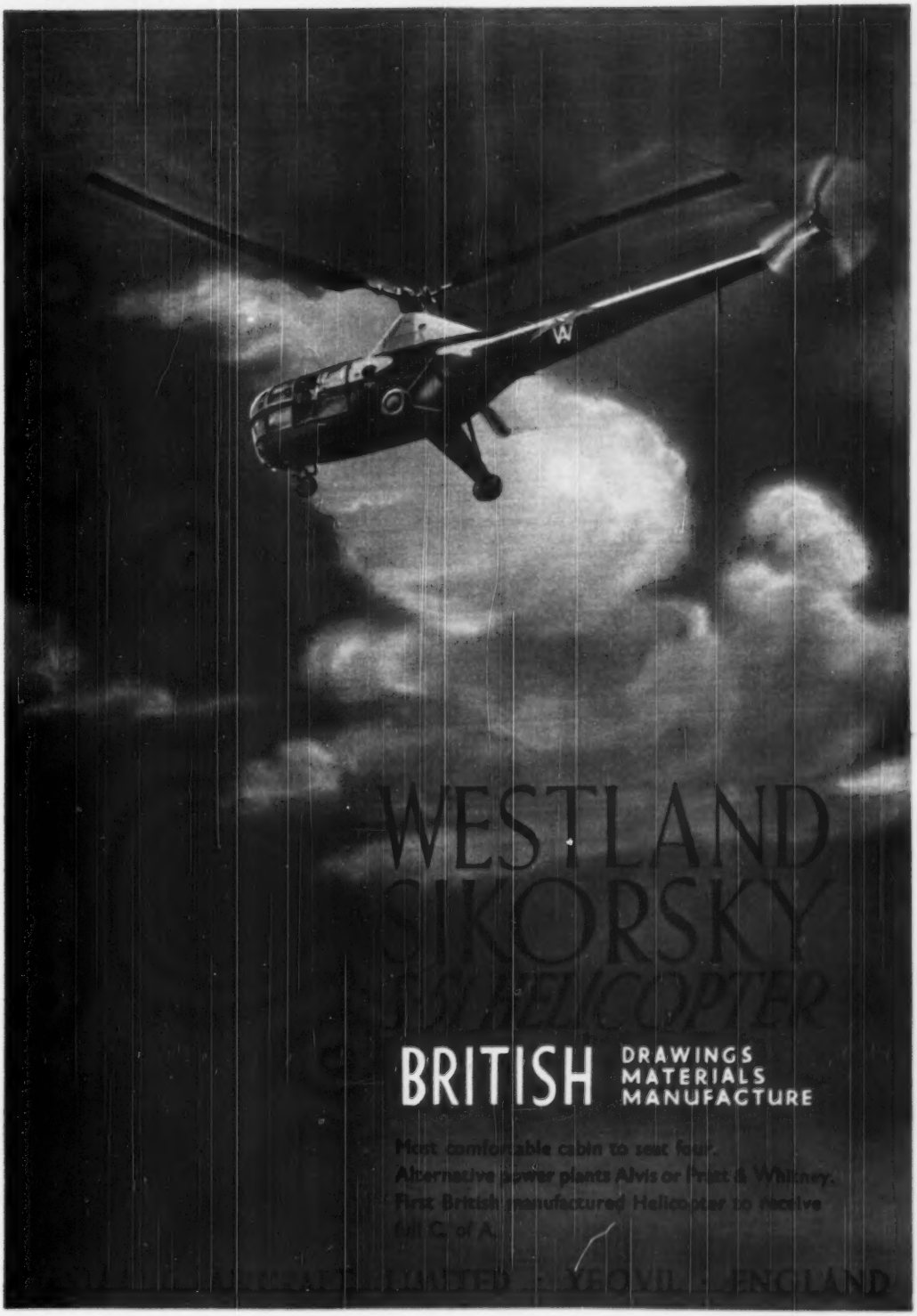
WESTLAND
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DRAWINGS
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Most comfortable cabin to seat four.
Alternative power plants Alvis or Pratt & Whitney.
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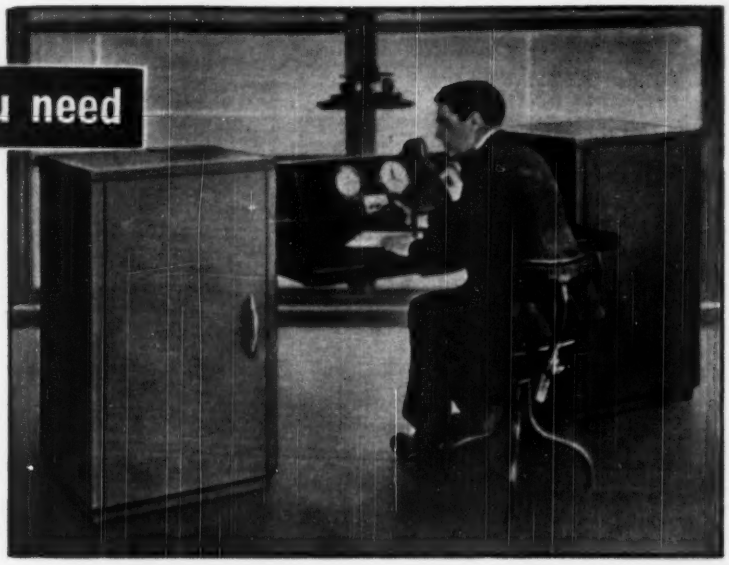
Which do you need



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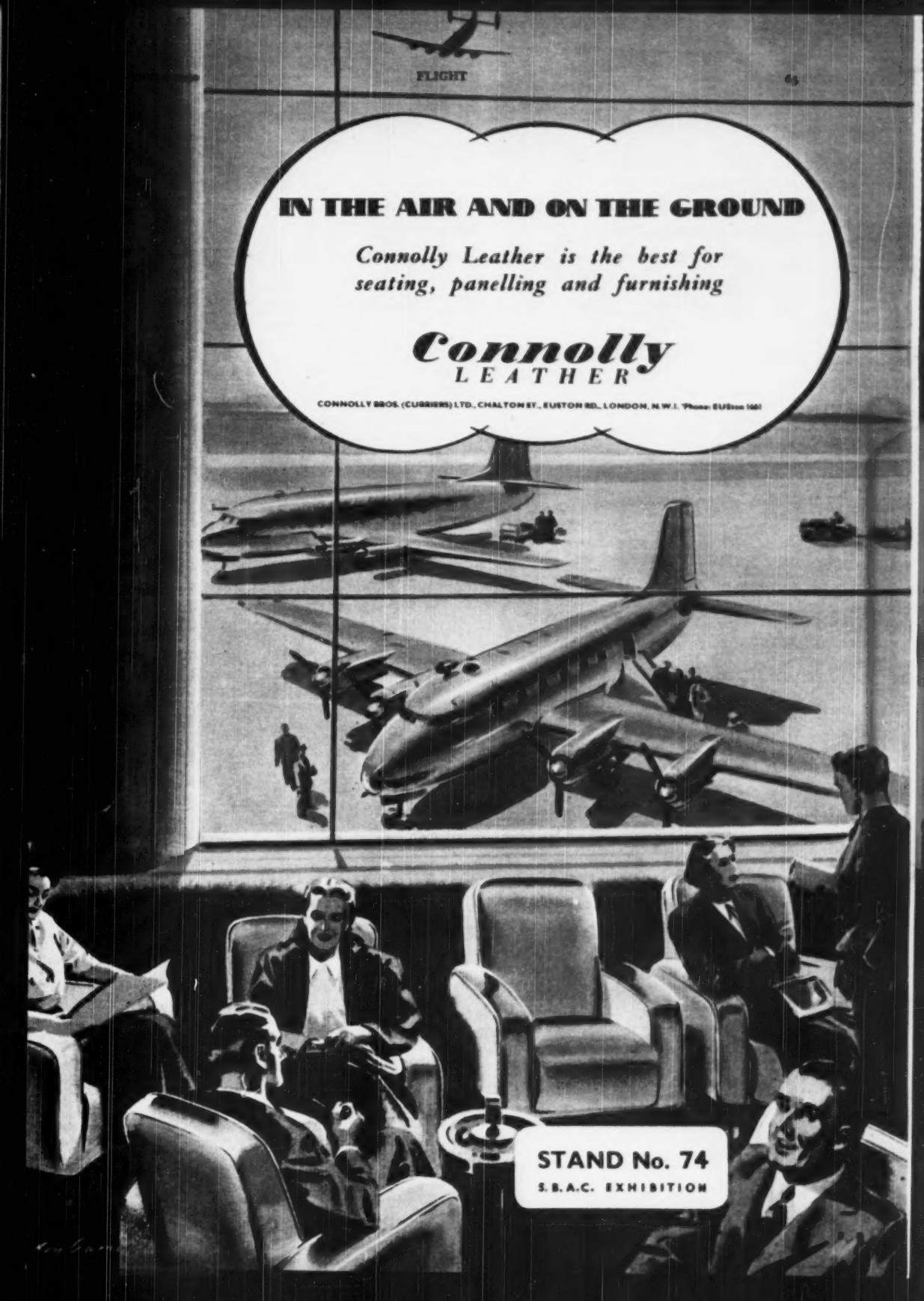
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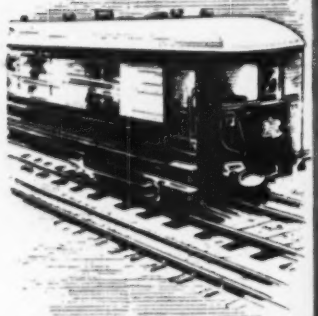

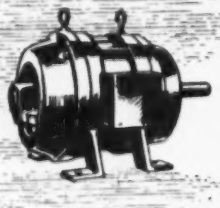

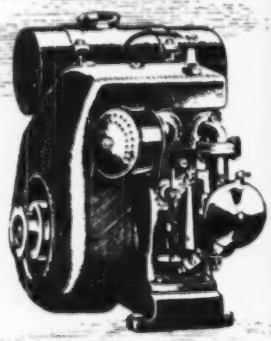

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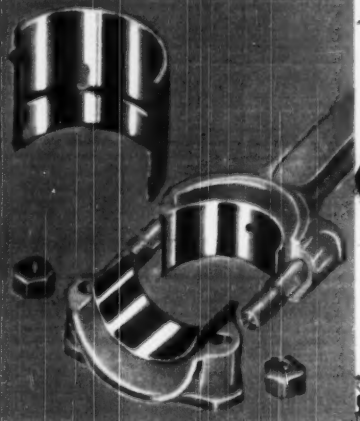

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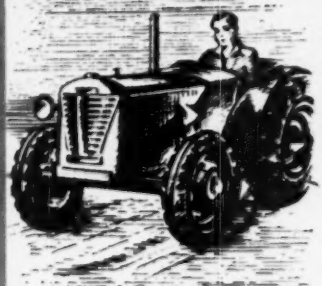

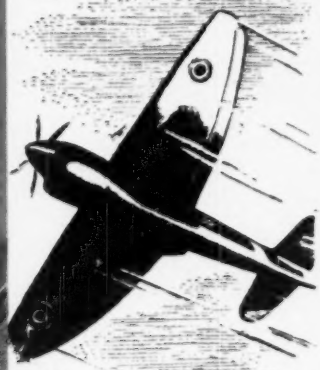

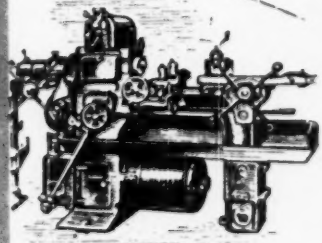

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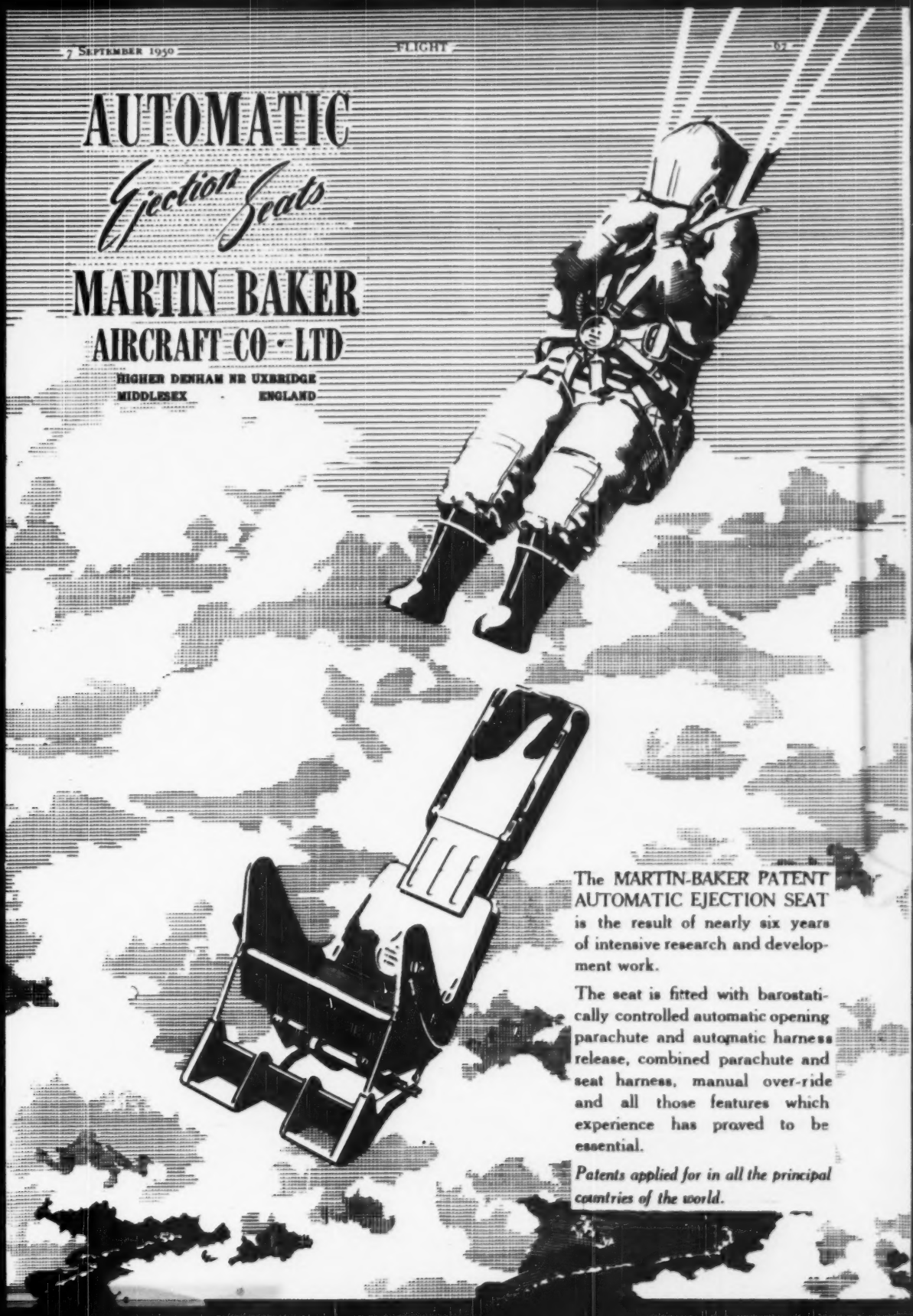

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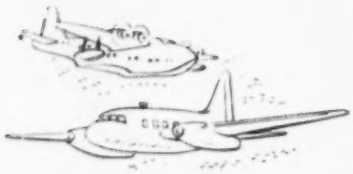

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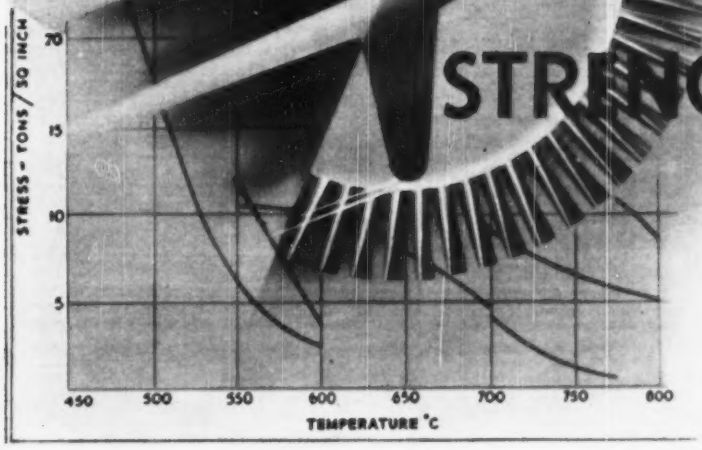

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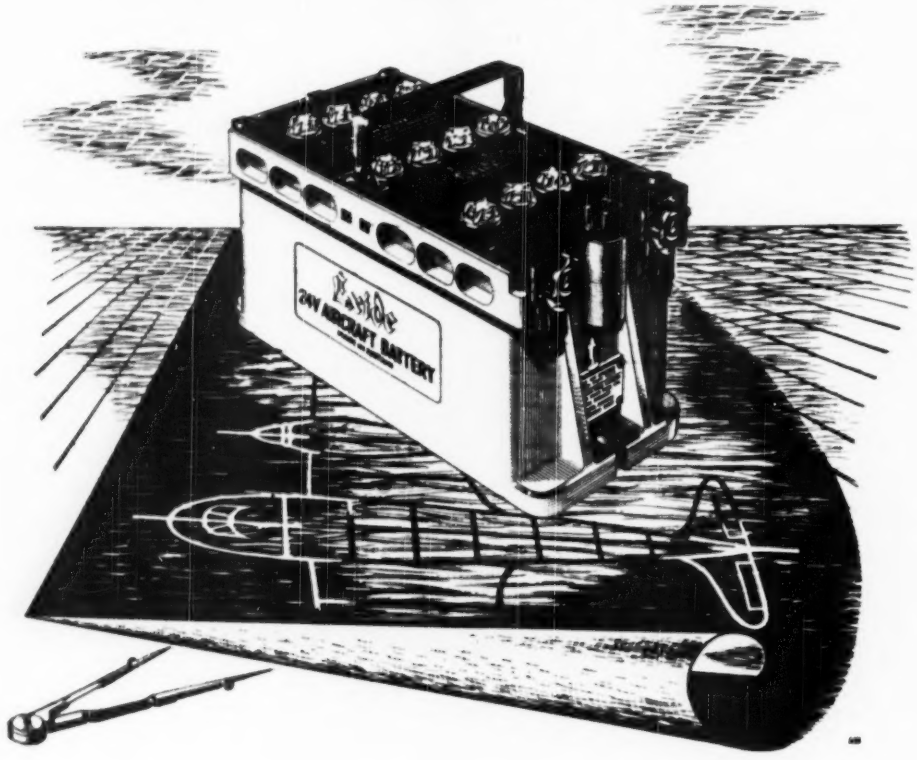

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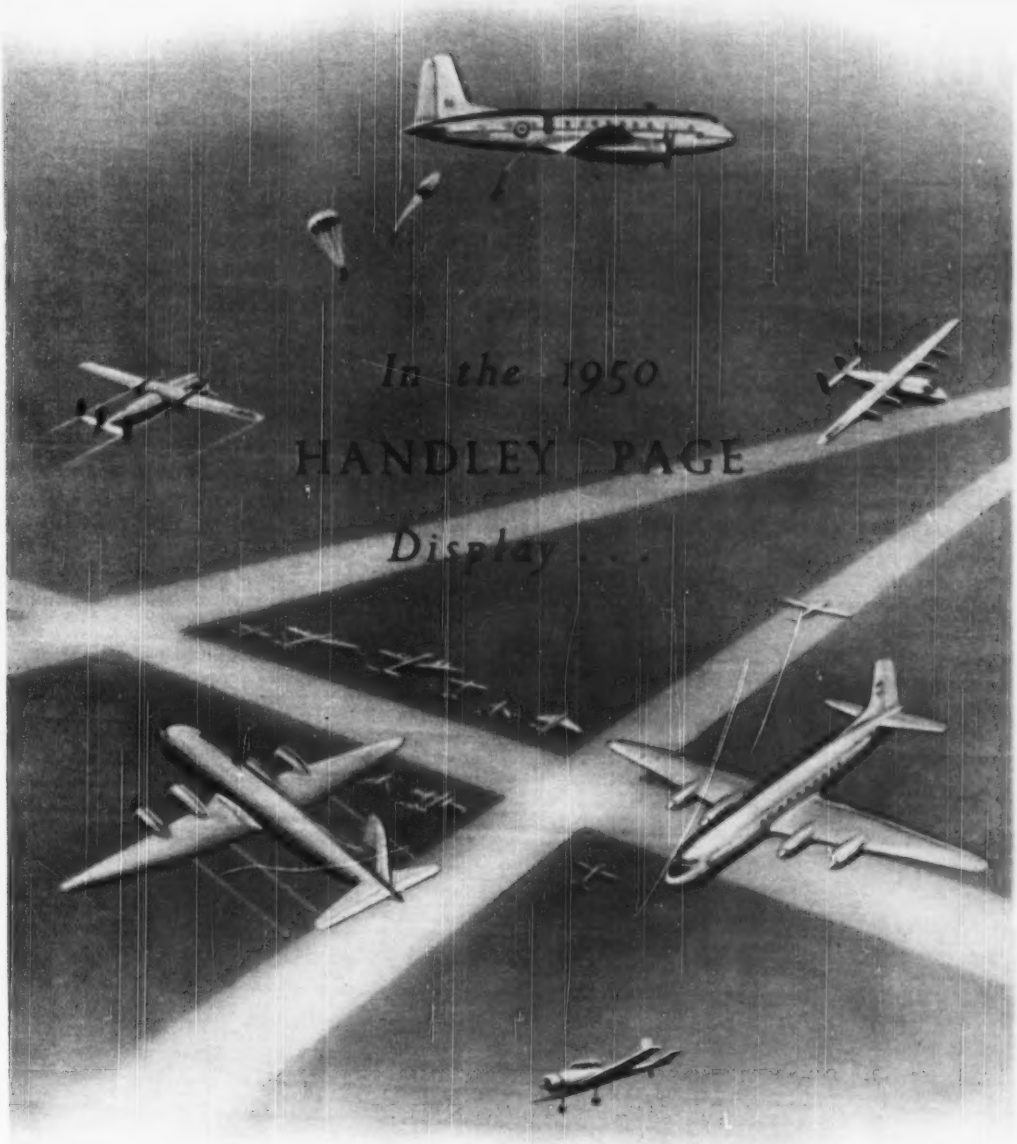

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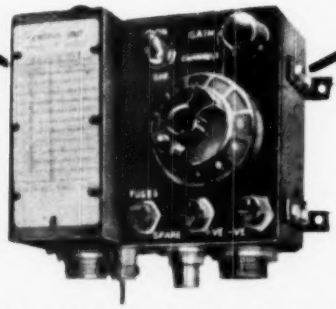

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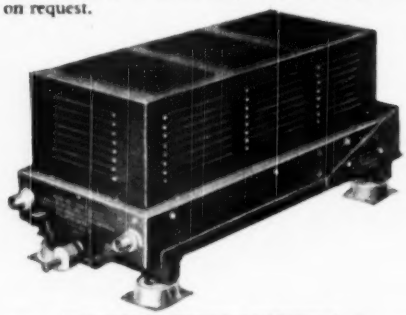

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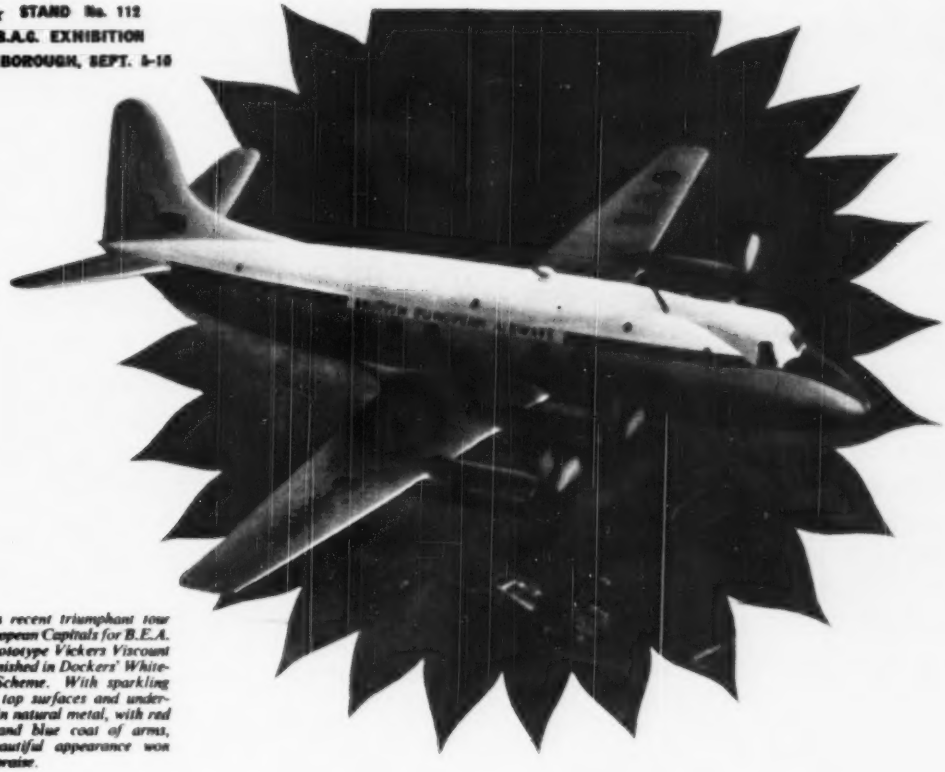

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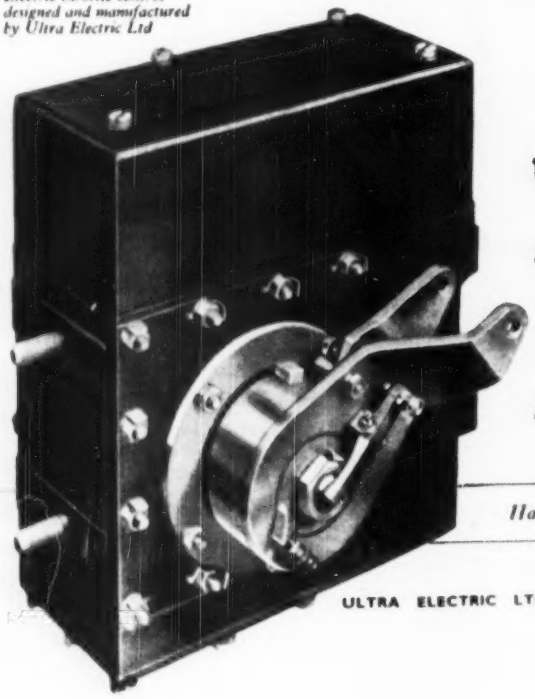

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